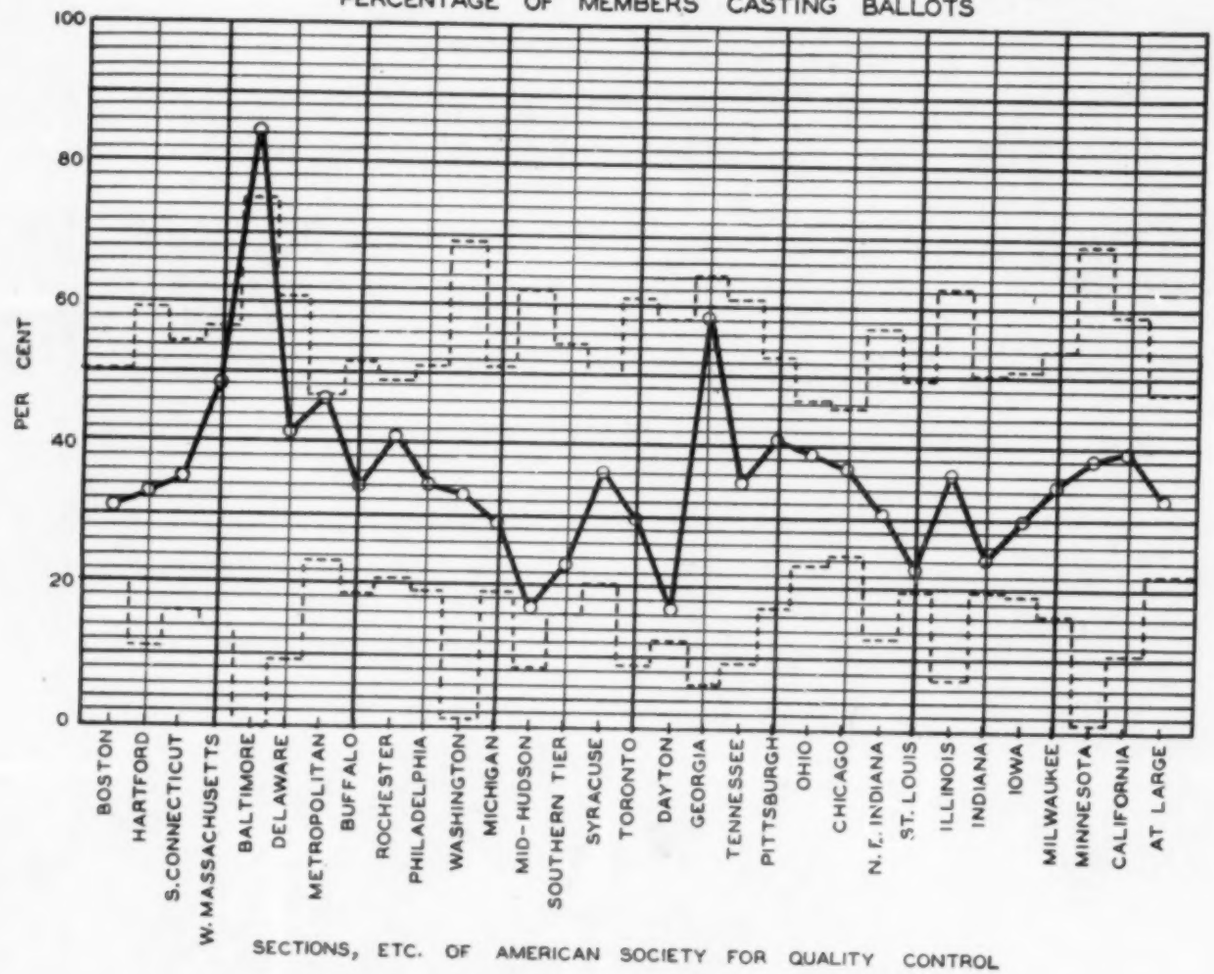
Industrial QUALITY CONTROL

VOL. V SEPTEMBER, 1948 NO. 2

CONTROL CHART – ANNUAL A.S.Q.C. ELECTION JUNE 17, 1948

PERCENTAGE OF MEMBERS CASTING BALLOTS



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For the story behind this chart, see note by H. G. Romig, page 5

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APPLICATION OF CONTROL CHART TO ELECTION RETURNS

In the recent national election of the American Society for Quality Control over 2,000 ballots were mailed to the membership. Each member was asked to return his ballot properly marked to indicate his choice for the four offices, placing the ballot in a sealed envelope, and inserting this envelope in a second envelope, together with nominations for membership in the national society. These ballots were to reach national headquarters in New York on or before the annual meeting scheduled to meet there on the evening of June 17, 1948. At the annual meeting extra ballots with two envelopes were given to those members who had not already voted and were included in the count.

The five tellers appointed by the president in accordance with the constitution met prior to the annual meeting with the secretary three different days and were given the sealed envelopes.

The procedure followed by the tellers gave them a list of the members in each section that cast ballots in this election. A tabulation was made, including those voting at the annual meeting, of the number of ballots cast by each section. The paid-up membership as of June 17 was tabulated for each section and the percentage of possible ballots actually cast was determined section by section and also for all sections combined, including Members At Large. The p value for the society was 35.5%. Using this as a standard, 3 sigma control limits were computed for each section. The p values and corresponding control limits are given on the chart on page 1. Only one point was outside control limits in a favorable direction, since for this study a p value of 100% would be considered as perfect. The number of possible valid ballots was 13 for Baltimore and 11 were cast. This chart indicates that the election return was well controlled with respect to the over-all level of $p' = 35.5\%$.

TELLERS:

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H. G. Romig, Chairman

Industrial Quality Control

VOL. V SEPTEMBER, 1948 NO. 2

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The Foreman's View of Quality Control*

WADE R. WEAVER

REPUBLIC STEEL CORPORATION

The literature on the subject of just what is the correct way to initiate a Quality Control Program is voluminous. Many people who ought to know say that it must start "on the machine," or at the bottom. Many competent and experienced people state that it must come "from the top down." Both of these viewpoints can be accepted as correct. There is much to be said on both sides. In any event the peculiarities of the particular organization under study must be taken into consideration very carefully before making a selection.

In contrast with both of these theories, this paper will take the position that the best place to start is "in the middle," and will try to demonstrate and defend this position. As is often the case in such matters, we base our judgment on personal experience, so I shall report some of my own experiences in working in this particular fashion, present some typical problems and the application of Quality Control techniques to them, and give some idea of the savings resulting.

BACKGROUND

First, in order to provide a little better picture of the background of some of the scenes to be discussed, a description of my company's major activities, its management structure, and just where the foreman fits in, will be helpful. Republic Steel is one of the larger corporations in the country, being the third largest producer of steel. It may be said to be composed of three major divisions, Mining, Steel Production, and Manufacturing. The first, of course, provides certain of the raw materials used by the second, such as coal and iron ore. The Steel Plants produce the iron and steel and various products therefrom, such as castings, bars, plates, sheets, strip, rods, wire, pipe, etc. The Manufacturing Divisions fabricate many commercial articles by further processing the products made by the Steel Districts into such items as bolts, nuts, rivets, cold drawn bars, lockers, filing equipment, kitchen cabinets, automotive stampings, pails, kegs, drums, electric-weld tubing, tie plate and track spikes, conduit, screen, etc.

These three operations are headed by the Vice-President in Charge of Operations who has three assistants, one for each major operation. In addition, he has an operating staff composed of experts in the major fields involved, such as Engineering, Accounting, Combustion, Lubrication, Industrial Engineering, Metallurgy, etc. Each Mining District, each Steel Producing District, and each Manufacturing Division has at its head a District Manager, who is in entire and complete charge of that particular district, and who reports to the particular Assistant-to-the-Vice-President involved. This District Manager, in turn, has his own operating staff composed of the Superintendents of the various departments existing in that particular district. This may seem like a somewhat complicated executive and administrative set-up, but it is really about as streamlined as it can equitably be made. However, one can readily see what would be involved in trying to have a quality control program instituted "from the top down" in such an organization.

My particular place in the general staff function is to look after all problems pertaining to general "in plant" quality; the outgoing quality level is strictly a function of the Metallurgical Department. This covers a good deal of territory and includes anything and everything pertaining to the production of a greater amount of a higher quality material at lower cost. One can readily appreciate that it is an unusually lucrative field for the application of quality control techniques. I have been extremely fortunate in having my own representative in each of these major districts, and hence have fertile ground in which to plant a seed, and I fully realize that this is an advantage which many wishing to start a quality control program would lack.

THE FOREMAN

We now arrive at what is really the "meat of the coconut" in this far-flung enterprise, the Foreman. Actually, he is the man who "makes things tick." He has intimate contact with the workman; he is conversant with the workman's peculiarities. He is the man on whom management must rely to put across to the man on the job top supervision's policies, thoughts, and desires, whether they pertain to production, safety, or any other subject, including quality control. So we must consider that an organization is only as strong as its foremen, and always keep in mind that we must have these men "in our corner." A good foreman will try to put across the ideas of his supervisors even if he does not believe in them himself, or is not sold on them; but in that case his efforts are likely to be somewhat half-hearted. It is much more to be preferred that he be fully cooperative and enthusiastic in his approaches, and for this reason we must sell him. "All this is not new," you will say, and it is not; but just what do we do to further it?

In our company we have a strong belief that there is nothing quite so effective as appealing to a man's pocketbook. Accordingly, there has been set up a bonus plan, whereby a foreman who "qualifies" receives a percentage of his salary as a bonus for savings resulting from unusually good performance in his department. A series of factors representing "standard" performance has been built up for each operation, and

*Paper given January 23, 1948, at the Illinois Section Quality Control Clinic, Peoria, Ill.

each of these factors has its bearing on the incentive bonus. In this way the participants are willing, and indeed anxious, to learn to use any tool which will aid them in reducing costs, saving material, or producing more or better product. In order to qualify for participation in this incentive bonus plan a foreman must display suitable interest and activity as judged by certain pre-determined standards; even after being a participant he must continue to display such desirable qualities or he is removed from eligibility.

We thus have a fertile field for introducing new ideas or techniques to the foreman, and Republic's experience in this direction has been very favorable. When speaking of Quality Control, one of the very first realizations must be that nearly all people, including those much higher in rank than foremen, are characteristically afraid of mathematics, and that any effort to introduce "statistical control" to a foreman is almost certainly doomed to failure. It is positively not necessary to be a human slide rule or a mathematician to understand and use many of the quality control techniques. All that is required is eighth grade arithmetic. If we are studiously cautious and careful in our presentation, the foreman's "exposure" is sure to "take." Apply the simple techniques in the right places and reserve those that are a little more fancy for the foremen who are capable of handling them. Teach the foreman those techniques which will apply to his particular job and type of work; don't unnecessarily confuse him.

INGOT WEIGHTS EXAMPLE

In our business the subject of yield (the ratio of good final product to initial raw material), and the conservation of materials, are of extreme importance. Several of the examples soon to be presented bear on this phase of operations. The first three steps in making steel are (1) the making of coke from coal, (2) the making of pig iron from coke, limestone, and iron ore, and (3) the making of steel from the pig iron, limestone, and steel scrap. The last step in the making of the steel is pouring the molten metal into a suitably shaped cast iron mold, thus making what is called a steel ingot. These ingots commonly weigh from 5 to 20 tons each, and they are the raw material for the many and varied subsequent rolling operations which produce the steel products of bars, plates, sheets, etc. familiar to the general public. There are certain portions from the top and bottom of these ingots which are not usable and are discarded, just as there are parts of an apple or carrot which are discarded. The good product remaining after such discarding represents the "yield" which is obtained from the ingot.

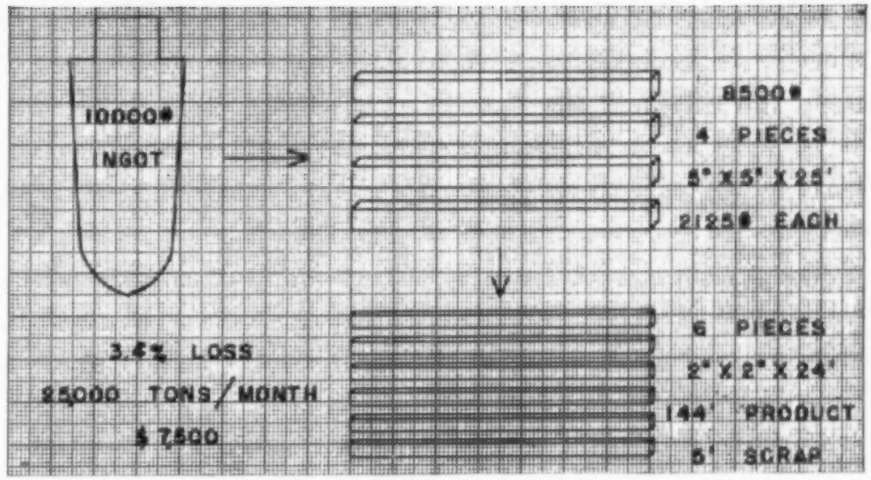

FIGURE 1. INGOT TO BILLET TO BAR

Let us assume that you, as a customer, are making automobile axles and require a piece of steel 2" x 2" x 6".* We would produce this 2" x 2" bar from a 5" x 5" billet obtained from rolling an ingot. Let us assume we start with a 10,000#* ingot (one type ingot has the characteristic shape shown in Figure 1) and obtain a yield of 85% after discarding the unusable portions. The product is rolled into a section 5" x 5" and cut into convenient lengths, in this case four pieces 25' long, weighing 2125# each. (4 x 2125# equals 8500#).

*2" = 2 in.; 6' = 6 ft., 10,000# = 10,000 lbs.

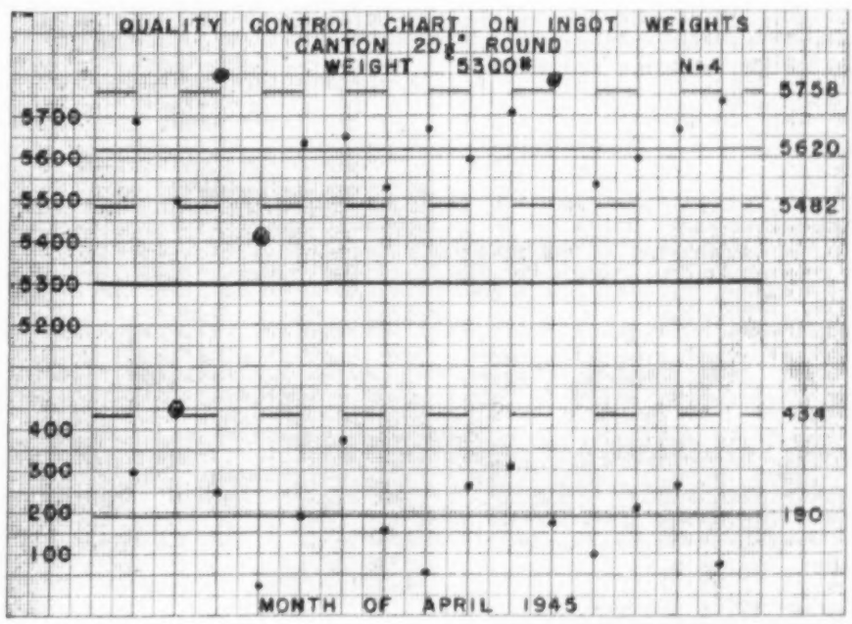

FIGURE 2. CONTROL CHART ON INGOT WEIGHTS—APRIL, 1945

The 5 x 5 billet is rerolled on another mill into 2 x 2 bars, and simple arithmetic tells us that under normal operating conditions we should obtain 149' of product from each 5 x 5 billet. We must cut pieces 6' long, or multiples thereof, from this 149' of 2 x 2, and any way that we try we will always have 5' of scrap. This amounts to nearly 3½% of loss in yield, and on a mill rolling 25,000 tons of such product a month, this represents a loss of $7500 per month, subject to reduction; quite a sizable stake on which to work.

A magnified example of this was found in one of our plants where our yield studies on a certain ingot reflected intolerable losses in rolling this ingot into billets. Based on the requirements of the Order Department, which was endeavoring to have the mill produce billets to reroll into bars without the loss just discussed, this ingot was originally designed to weigh 5300#. In April of 1945 we initiated an ingot weighing program on a statistical basis, and from the data so obtained constructed a simple Shewhart Control Chart, or an X bar and R Chart. What we found is shown in Figure 2, the upper panel being the X bar and the lower panel the R chart.

The average weight was actually 5620# and, from one lot of ingots to another, the lots varied from 5482# to 5758# average per ingot (and even worse in individual cases), while within a given lot the average variation from one ingot to another was 190#, and ran as high as 434#. It was obvious that ingot weights were much too erratic and all too heavy for the intended purpose. Naturally, the controlling factor in the ingot weight must be the volume of the mold into which it is poured. These molds were being obtained from two suppliers, and a check of their dimensions showed that while one supplier was doing much better than the other, both were making molds oversize in dimensions. Mold suppliers were contacted, specifications and tolerances discussed, and three months later the situation had improved as shown in Figure 3.

The average overweight had decreased from 320# to 190#,

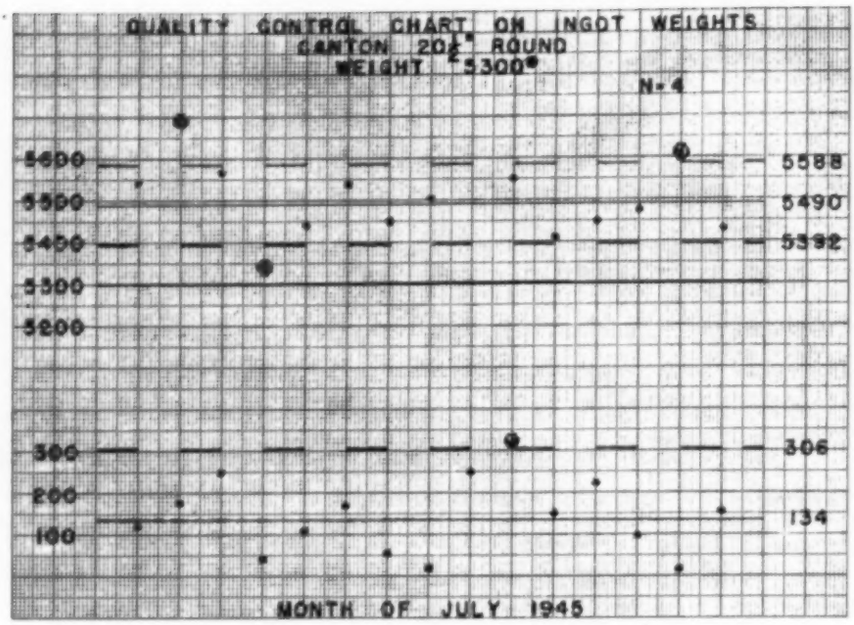

FIGURE 3. CONTROL CHART ON INGOT WEIGHTS—JULY, 1945

the variation from lot to lot was reduced and the variation within a given lot was now only 134# average compared to the original 190#. We set our sights for a 5300# ingot with not over 100# average variation from one to another, made further corrections in the process, talked further with our mold suppliers, and by April, 1946 the results were remarkable. (See Figure 4).

Our ingots now averaged 5296 lbs. and had an average variation one to another of only 82#. All this consumed just one year's time, but it was well worth the effort. This brings us to an extremely important part of any quality control program: the evaluation of results, and, of course, the expression which registers most readily with anyone, be he workman, foreman, superintendent, or president, is dol-

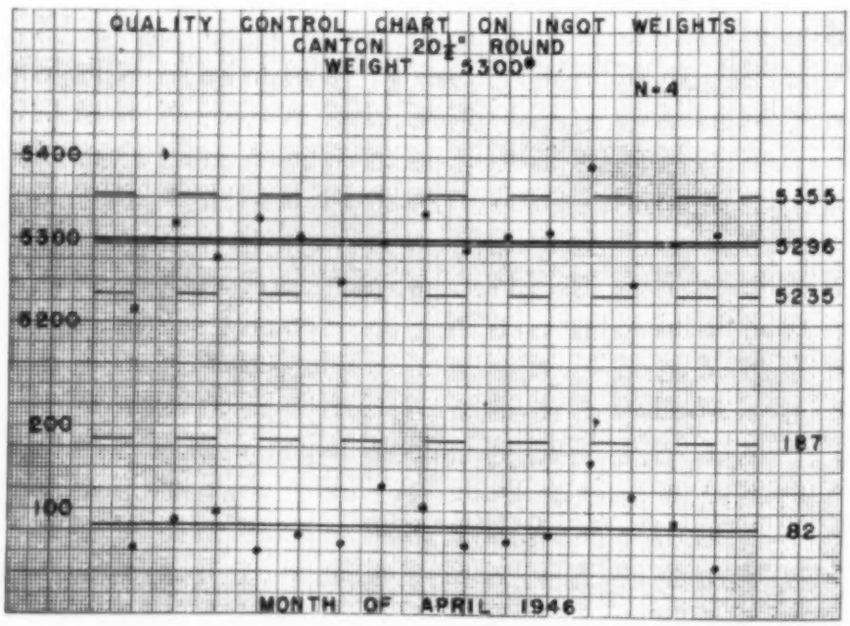

FIGURE 4. CONTROL CHART ON INGOT WEIGHTS—APRIL, 1946

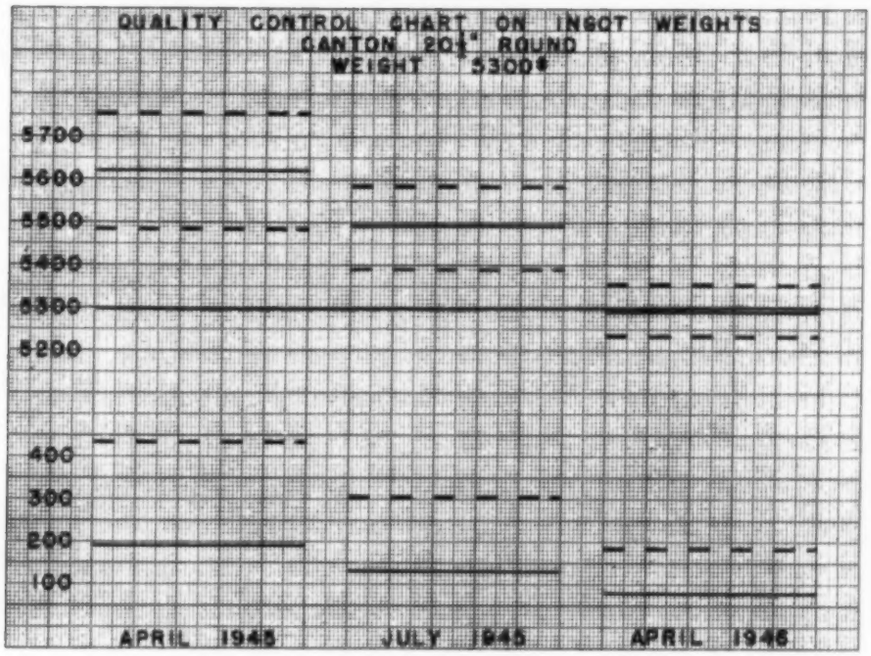

FIGURE 5. CONTROL CHART ON INGOT WEIGHTS—THREE PHASES

lars. It was a simple matter to calculate the savings in pounds per ingot and, from the number of ingots poured during the year, the total saving in tons. The value of a ton of steel at this point being well known, the savings for one year could be evaluated. This particular application turned up a saving of slightly over $175,000.

Figure 5 combines the three previous charts, minus the specific figures, so that one may see the progression of the study. The savings from this improvement meant improved yield due to decreased loss, and actually put more money in the pockets of the foremen participating in the incentive bonus plan, for yield is one of the major items affecting this plan. How much trouble do you suppose we had on the next project with these foremen? Did we receive cooperation? Were they enthusiastic? No answer is required!

This same type of problem may exist in your particular business. The volume of any type of container related to the amount of material it is desired to put into that container; the waste in any process where an originally larger mass of material is sub-divided into smaller parts; the deviation from standard or desired size, especially where there is more than one source of supply; all these are every day problems, and just exactly how sure are you that you know all about them?

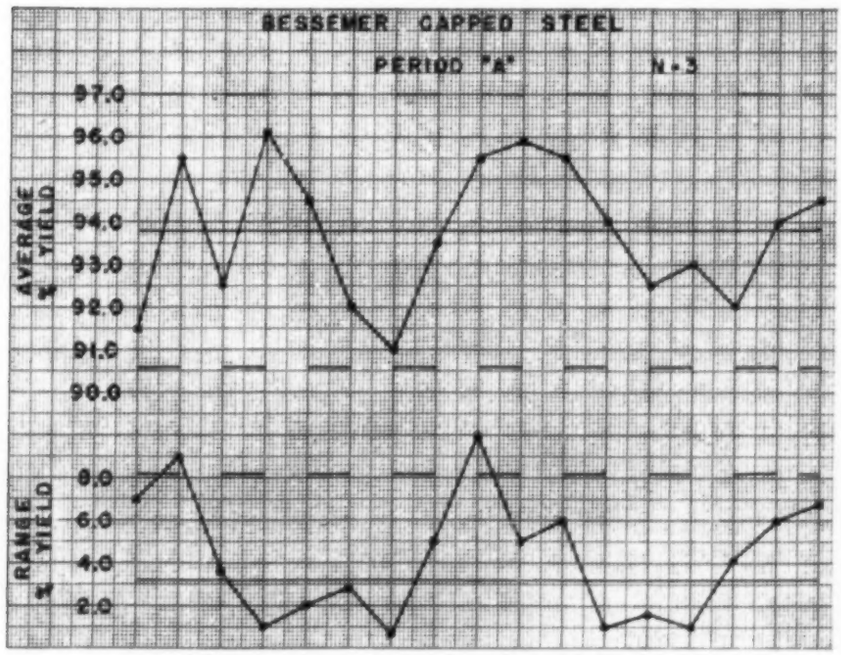

FIGURE 6. BESSEMER CAPPED STEEL—PERIOD "A"

BESSEMER CAPPED STEEL EXAMPLE

Another example involving yields of products made on a rolling mill brings out the psychological factor which has been repeatedly demonstrated as being of great importance in the use of quality control charts. Fortunately, most people have a certain amount of pride about their work. It is human nature to want to do a better job. This particular job is one where personal attention to detail plays an important part, and where just ordinary, routine performance, or more especially, **careless** performance, produces just ordinary results, while cautious, careful, attentive performance can result in some exceptional improvement.

Figure 6 shows the yield improvement made on a certain popular grade of steel in a specific operation. Period "A" is the history period, covers 60 days, and reflects normal practice. The limits are those actually obtained for the 60 day period; the actual points are a typical section of the original chart. After the history was developed, the entire subject was explained to the General Foreman, and the potential savings to be derived from better yields was exhibited. That was all!

Period "B" (Figure 7) is of three weeks duration and reflects performance 60 days after Period "A". Remember, nothing had been done other than a short daily discussion of the chart and how things

were progressing. Note that the yield level has improved from 93.8% to 94.8% and the average range reduced from 3% to 2%.

Period "C" (Figure 8) follows Period "B" by 90 days. Note the improvement in yield from 93.8% in the history period to 95.5% in Period "C", covering an interval of seven months. This can be attributed to a purely psychological reaction on the part of the foreman. To be sure he **did something**, but only because he took pride in seeing a concrete reflection of his efforts **on paper**, and of course, in his pocket book! This particular chart is one of four set up on the four grades of steel being produced on this particular mill, and again we come to that important item of evaluation of results. Because of the yield improvement of 1.7% on this specific grade and other improvements on the other three grades (naturally, the most impressive one has been shown here!) it was a relatively simple matter to calculate the dollar savings for Period "C", which happens to be exactly one month. Total savings on this job were $15,207. Fifteen thousand dollars in one month will pay for a lot of Quality Control activity! "That seems like an awful lot of money" you will say. Well, it is, but you must remember our company deals in large volumes of material; this particular mill produces about 50,000 tons every month.

Figure 9 combines Figures 6-8 into one chart, but on a reduced scale, so that the improvement may be better visualized. Note that in each successive period not only is the average yield higher but the spread or variation is reduced.

Just pick out some operation in your business which you feel could be improved, or on which the savings would be much more worth while if it were improved; obtain some history and chart it, explain the project carefully to the foreman, and watch the results. You can almost guarantee them!

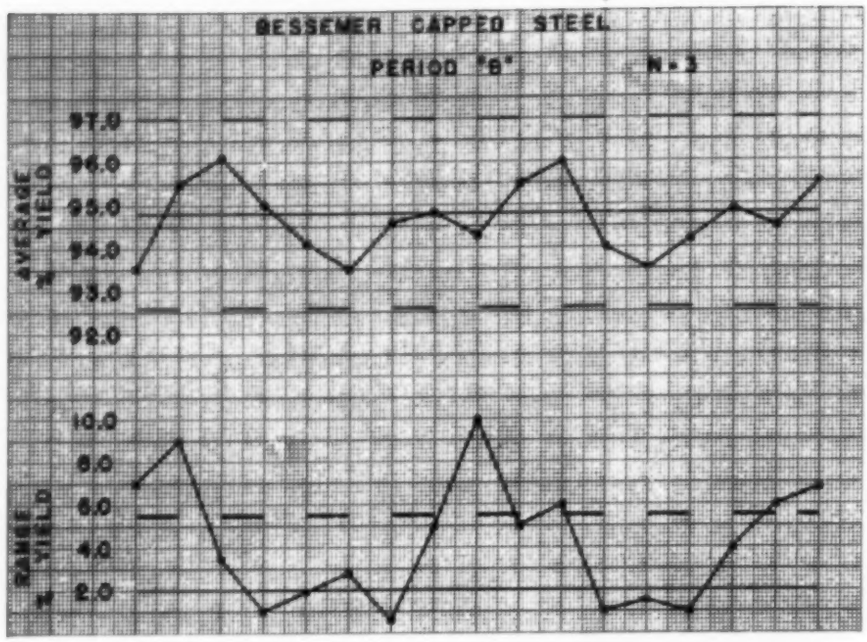

FIGURE 7. BESSEMER CAPPED STEEL—PERIOD "B"

AN EXAMPLE OF CONTROLLING PROCESS LEVEL

An excellent illustration of just what can be done by controlling the **level** of a process which is "in control", but at an undesirable level, is brought out by the next example.

All articles are produced to some kind of specifications, and the particular commodity charted in Figure 10 happens to be one which is based on nominal weight with a plus and minus tolerance of 3%.

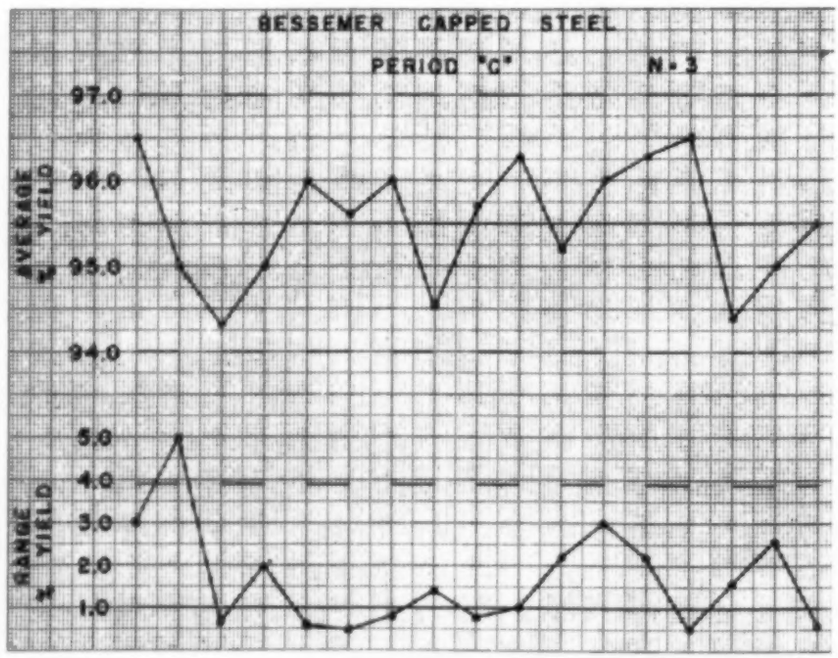

FIGURE 8. BESSEMER CAPPED STEEL—PERIOD "C"

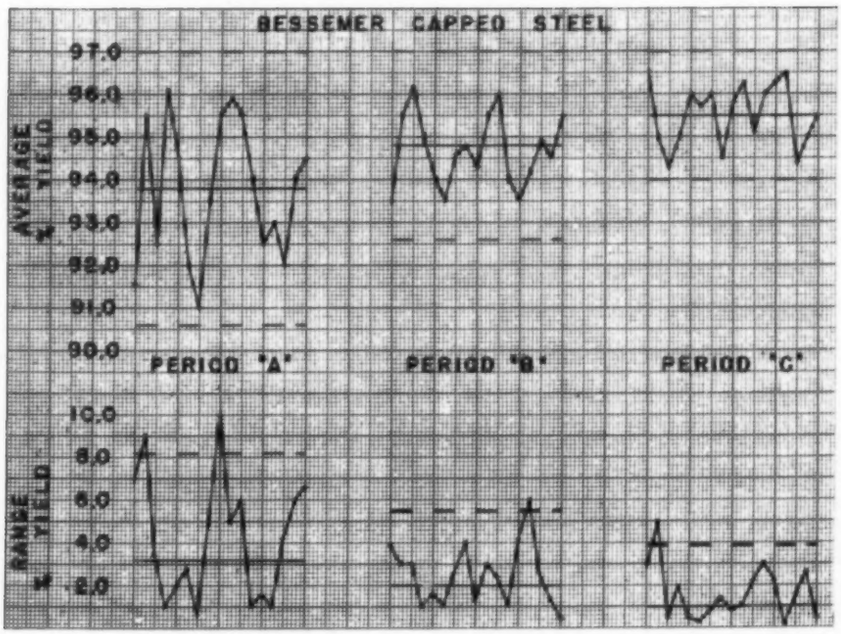

FIGURE 9. BESSEMER CAPPED STEEL—THREE PHASES

You will probably think of many products sold in this manner, where strict adherence to the contractual specification, but on the **low** side, would enable you to make more articles out of a pound or a ton or a gallon of raw material. The first requisite of an attempt to do a job of this kind is that your process be "in control" as displayed by the quality control chart. A process can be "in control" and yet be operating at an undesirable "level," but efforts to alter the "level" of a process not definitely known to be in control within limits narrower than those prescribed by the specification limits, would be disastrous.

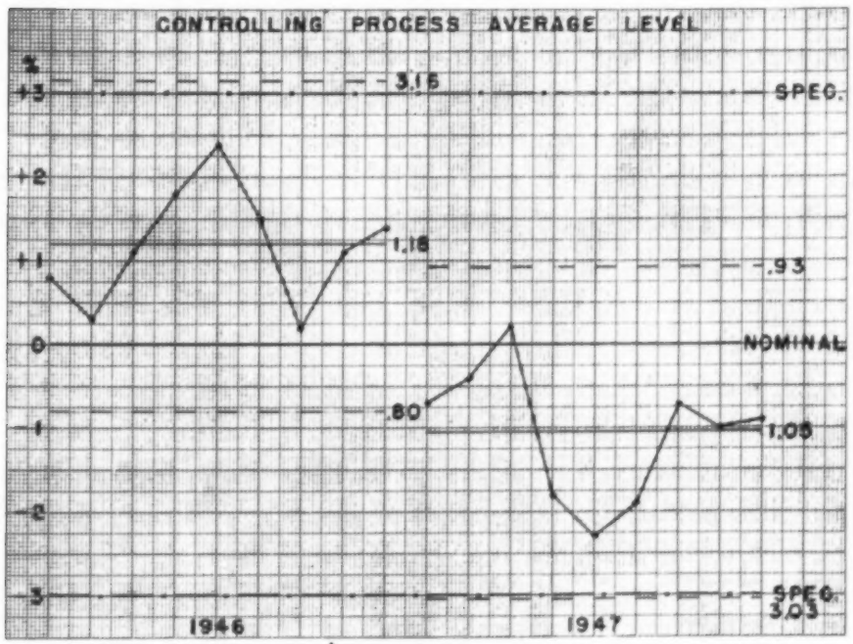

FIGURE 10. OVER AND UNDERWEIGHT PRODUCT

Figure 10 shows that in 1946 our product was well in control, but at an unnecessarily high level. The process was averaging 1.18% above the normal weight with the Upper Control Limit slightly higher (3.16%) than the upper specification of plus 3%. This condition obtained because the customer would never complain if the high side of the specification were exceeded, so operations was "playing safe". A lack of knowledge of the "control" of the process was preventing a lower level of operations. (The limits shown are actual but the points are a typical section of the original chart.)

By virtue of the process being in good statistical control, it was possible during 1947 to lower the process average by an amount such that the Lower Control Limit was equivalent to the lower specification limit (actually minus 3.03% vs 3.00%). The process average in 1947 was 1.05% below the mean, a net saving of 2.23%; on large tonnages this is more than appreciable.

The decision on whether or not the process average level is to be reduced must often be a management function, but do not forget that the foreman is the one who has to put management's policies into effect and get the job done. The chart provides him with a valuable tool to guide his actions.

These case histories are all simple, common, examples of the application of the Shewart Quality Control charts which are designed to control quality during production. The mathematics and the understanding of them is simple; they require a minimum amount of time to execute and are a powerful tool for the foreman. He gets a pictorial view of the results of the efforts of his department or group; he soon learns to recognize trends and to forestall them; he sees the results of cause and effect; he can evaluate person-

nel and "rate" his men; he has a better understanding of what goes on in his department; he is a better foreman.

COATING WEIGHTS EXAMPLE

Let us look next at a few other types of quality control techniques which are very useful; in fact, almost indispensable. At least they are indispensable to a truly accurate knowledge of the existing conditions.

Figure 11 is a typical X bar and R chart on the weight of coating applied to, let us say, galvanized sheets or pipe, furnished to a specification which calls for "an average of 200, with no lot under 190, and no single piece under 180". Heavier than specified galvanizing weights are almost never objectional, but are obviously much more costly to the producer who gets paid for only the "nominal". The month of February has been selected because it exhibits the downward trend, which resulted from work started following the January analysis as a history period. The process is well in control but at an unnecessarily high level, and at a definitely uneconomical level of 207. Each point on the chart represents the average of five tests corresponding to one "lot" of pieces.

Tests are made at suitable intervals and the operator can easily misinterpret their results. If he obtains results ranging from 195 to 225, barring unusual conditions, he will usually figure this to be a spread of 30 points and set his sights to aim at the middle, or 210. This is exactly what he was doing. A better picture of this operation is given by a frequency distribution diagram.

Figure 12 shows the number of individual tests obtained at each value from 195 to 230 with a smooth curve drawn in to outline the variation pattern. These data were used to construct the control chart in Figure 11, which is based on lot averages and ranges. Both Figure 11 and Figure 12 show the process average at 207 against a nominal of 200. In Figure 12, however, for the first time the upper and lower control limits are expressed as "3 sigma" values, which tell us, of course, that any "sub-

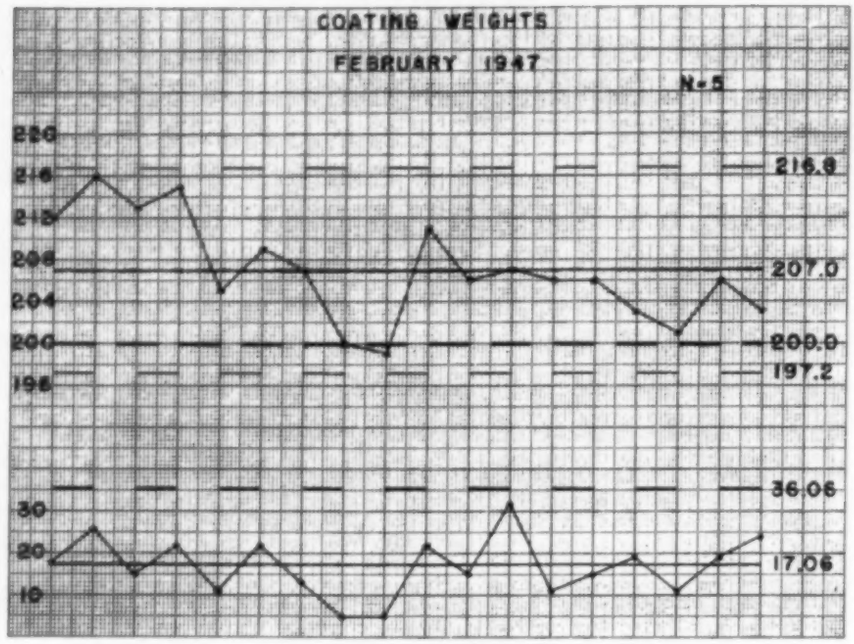

FIGURE 11. CONTROL CHART FOR COATING WEIGHTS—FEBRUARY, 1947

group" of tests may be expected to average as high or as low as these values. This corresponds to the "lot" variability, which the specification said must not be below 190.

How about the "individual pieces" which must not be below 180? These are bounded by the limits shown in Figure 12 as "3 sigma-prime-X" which are found by a simple calculation, and which show in this case that individual pieces cannot be expected to go below 185. Remember that the period exhibited on these charts is one in which a downward trend was already in progress. Observe that at this process level, by far the greater percentage of area under the curve lies **above** the nominal value of 200, indicating that more coating than necessary was

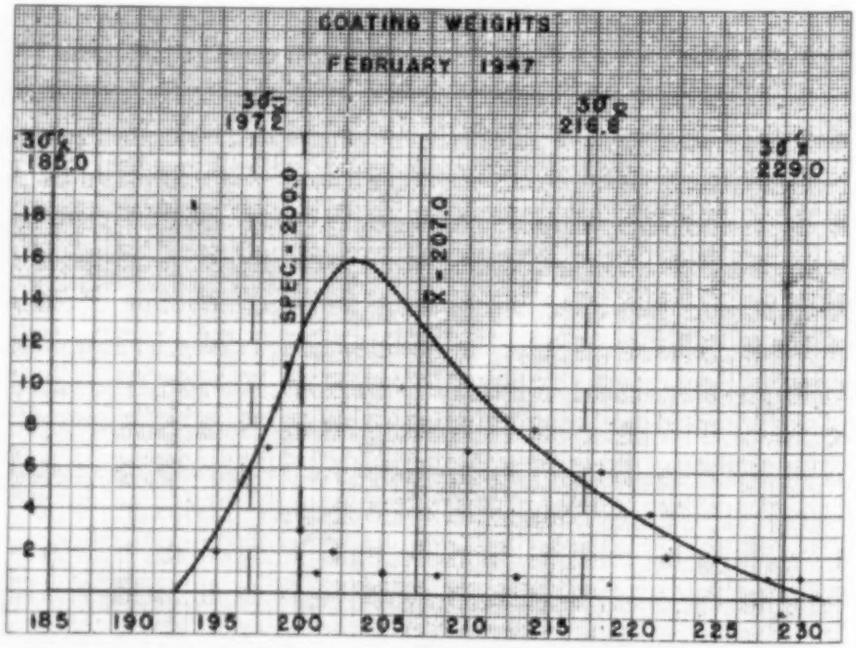

FIGURE 12. FREQUENCY DISTRIBUTION DIAGRAM FOR COATING WEIGHTS—FEBRUARY, 1947

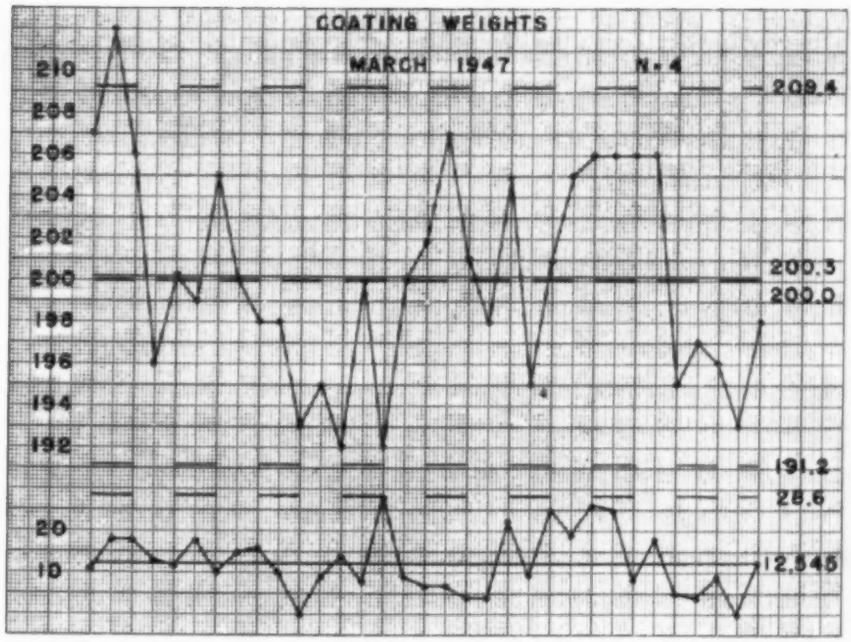

FIGURE 13. CONTROL CHART FOR COATING WEIGHTS—MARCH, 1947

being applied to a very high percentage of the total pieces.

Figure 13 shows the control chart for the following month, March. Observe that the downward trend exhibited in the latter part of February continued to what was considered to be too low a level and had to be brought back up again. The process average is now almost identical with the specified 200, and no single lot below 190 is to be expected. The variability within lots has also been reduced from 17 to 12½, an improvement of about 26% in average range.

Let's see what the process is actually doing.

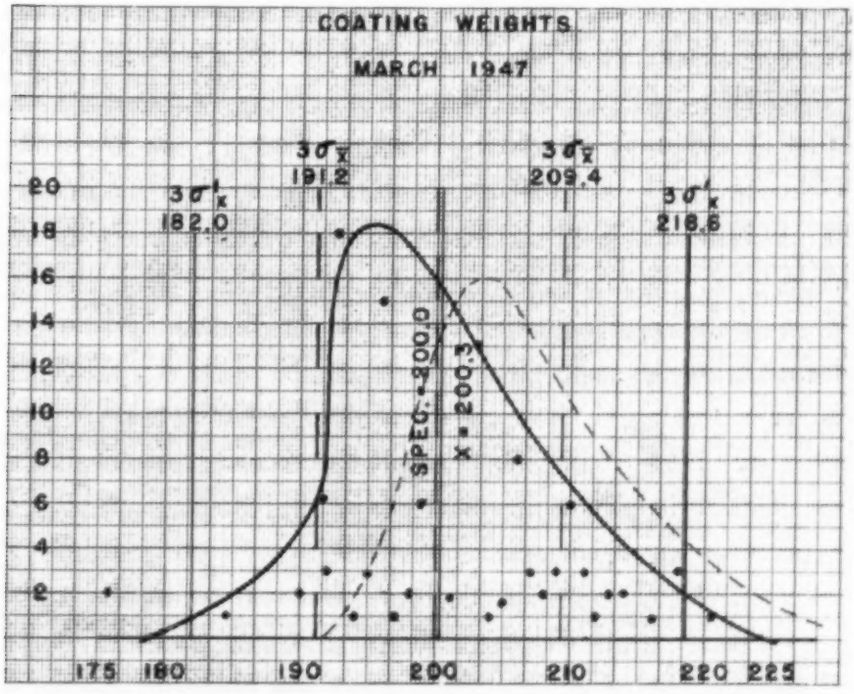

FIGURE 14. FREQUENCY DISTRIBUTION DIAGRAM FOR COATING WEIGHTS—MARCH, 1947

Figure 14 again shows upper and lower control limits for "individuals," and outlines the variation pattern with a smooth curve. The "heavy" tests have been reduced from a high of 217 to a high of 209 on lots and from 229 to 216½ on individuals, yet we still have no lot under 190 and only two individuals below 180. In both of these cases a breakdown occurred, and the product was known to be bad. But the important thing to note is that now we have the greatest number of our tests **below** 200, while those above 200 average out the process at 200. It is obvious that we are saving in coating weight not only **on the average** but also on the **greatest percentage** of our pieces. The broken line is the curve from the previous month, February, for comparison. Do not forget that, while this process was running at an undesirable level, it was well in control when manipulation of the level was commenced.

This particular job was a small one and the savings amounted to only about $1800 per month in this department. We have other similar departments, however. How long do you suppose it took the plant "grapevine" to transmit this success story? Almost immediately we received requests to help other foremen do this kind of a job too. Don't overlook the fact that it was necessary to have a process that was in control to begin with. If it is **not** in control the foreman's first job is to **get** it in control. Think about this a little and put yourself in the foreman's place. How much more interested he must be in his job; how much more able he must be to do a good job for you and for his company.

Do you have operations where the product will be perfectly acceptable providing it is above a specified minimum of something? Of course you do, and are you fooling yourself by "shooting at the middle" as we originally did on this one? Pick out a foreman or superintendent who has a little better than ordinary grasp of such subjects and try this frequency distribution technique. You might be surprised yourself at what it will turn up. One very handy result will be the prediction of scrap or rework on a process that is **not** in

control. You will know exactly what are the hazards of meeting a given specification with the operation as it exists, and you may then take appropriate steps to alter one or the other, or refuse the business if it is unprofitable.

RATING PERSONNEL PERFORMANCE

There has been a great deal of work done with control charts to exhibit machine or process capability and performance, but apparently the possibilities of this tool in the hands of the foreman as a means of rating **personnel** performance have been almost entirely overlooked. Recently we were experiencing quite a lot of trouble with production on one of our rolling mills. This mill had been running only 15 turns per week which required three crews, but was stepped up to 20 turns per week which necessitated adding a fourth crew. The poor performance was blamed on the new men and the weakening of the three original crews from which key men had been removed to form the skeleton of the new crew. This excuse was accepted as reasonable, but when, after three months of operation with four crews the same performance continued, it could no longer be accepted, and control charts were started on each crew. Much to the surprise of everyone, from the general superintendent down, the best performance was actually being turned out by the new fourth crew, while the crew that everyone agreed was the "best" of the original three was having twice as much as its share of trouble.

Figure 15 illustrates very nicely what can happen to a process when an operator "who knows all about everything connected with the process because he has been doing it for 18 years" gets on the job.

One of the improvements in the process which helped make possible the reduction of general level and the narrowing of limits seen in the preceding example was an electrical control on the galvanized unit. This was worked out and installed and the operators instructed on it and told to use it; what they did **not** know was that they were being charted individually. The afternoon turn (C) did a very nice job, as expected from the history on the day turn. The night turn (A) was at a higher general level in addition to being much more erratic. The day turn (B) was "back in the groove again." What do you suppose happened? Investigation disclosed that the night man was an old experienced operator who "didn't need any new-fangled doo-dads to help him run the thing," so he simply discounted it and went right ahead doing the same high quality job he had always done! We must realize that a good foreman has to be just a little smarter than the men under him. Let's give him the right tools to work with; charts such as these are good, practical tools. Of course, there are ways to keep control charts which disguise the true state of affairs, but just as bank examiners have ways of checking out the cashier's records, so the quality control manager has ways and means of running charts on control charts, and dishonest control chart practices are soon uncovered.

Don't be too smug about how well you know the comparative qualities of your various operators, or foremen, for that matter. Try this technique; you can't lose. It won't take the foreman long to realize that what he can use on his men someone else can use on him. The result will be a better foreman. We are all human after all.

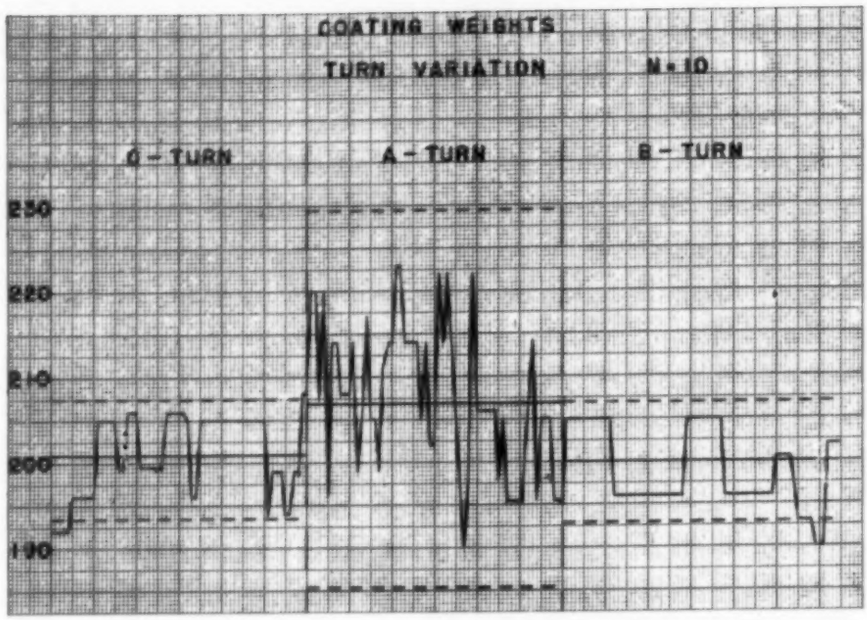

FIGURE 15. CONTROL CHART FOR COATING WEIGHTS—TURN VARIATION

CONFERENCE PAPERS

Twenty-nine of the thirty-eight papers given at the Second Midwest Quality Control Conference, Chicago, June, 1947.

A unique and useful cross-section coverage of quality control theory and practice in a wide range of industrial applications.

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Alfred L. Davis, Treas., ASQC
Rochester Institute of Technology
Rochester 8, New York

Editor's Note: Unfortunately there was not enough space available in this issue to publish Mr. Weaver's paper in its entirety; the remaining portion will appear in the November issue.

Control Effort in Proportion to Control Need*

WARREN R. PURCELL

SYLVANIA ELECTRIC PRODUCTS, INCORPORATED

The theme, "Quality Control in the Coming Buyer's Market," is especially timely at Sylvania. In the sale of some of our products we find that we are already in the buyer's market. Fortunately, however, our thinking, organizing, and planning for this shift in market pressure began about 18 months ago.

INITIAL ATTACK

At that time our first step was a study of the problems of measurable characteristics. It became evident that in this phase of the work our main emphasis should be on improvement in quality in the coming buyer's market. We had been operating under tolerances which were not well-defined, at least in the modern sense. The controls of the characteristics were carried out in a somewhat routine fashion and the amount of test was nearly the same whatever the quality level and degree of control. Because of this somewhat uniform amount of test, the proportion of the quality difficulties contributed by the various product types tended to be hidden, and the information was sometimes too general. A short study, however, indicated that the quality varied considerably between product types.

Our second step was a study of the non-measurable characteristics, or "defects". It became evident that in this phase of the work our main emphasis should be on reduction of inspection cost in the coming buyer's market. Our defective limit tolerances were well defined. Our inspection system was well organized and the Dodge-Romig sampling tables were being used to provide proper quality assurance. Because of the large number of product types, however, it was difficult to keep process average figures up to date, and as a result, the amount of total inspection being done in some cases was excessive. The presentation of results was general and often did not indicate which product types were contributing most heavily to the high cost of inspection. A short study, however, indicated that the inspection cost varied considerably between product types.

The standard approach to problems such as these is: (1) Make sure that the quality of incoming material is good. (2) Establish controls of the processes. (3) See that final inspection is adequate and economical. The reasoning behind this approach is that if incoming materials are good and processes are in control at the proper levels, the finished products will be so good that there is little need of final inspection, except as an appraisal and double check. This reasoning is excellent, and is undoubtedly the goal toward which we should direct our efforts.

RECONSIDERATION

In our case, however, this approach did not work well.

In the first place, it was difficult to determine to what extent the quality of the incoming material affected that of the finished products. It was, therefore, difficult to determine the economic balance between the cost of inspection and the value of quality assurance.

Secondly, we encountered some difficulties in the problems of establishing better controls of the processes. For measurable characteristics, in our experience, control chart techniques were powerful, but they could be made effective only by close cooperation between the statistician and the engineers and foremen. In a situation where finished product tolerances were not well defined, there was little incentive for close cooperation, since there was little immediate penalty for lack of control. For non-measurable characteristics, in many cases, the only control charts applicable were those for attributes. In our experience, attempts to use control charts for attributes were unsuccessful. In many of our processes trouble shooting seemed to be an art rather than a science and could best be done by those with manufacturing "know-how."

Finally, we made a rather complete study of final inspection procedures. We found, in studying the measurable characteristics, that the results obtained were not wholly satisfactory. There was a desire to improve quality, but there was a lack of specific information indicating forcefully where quality was good and where quality was poor. Engineers and foremen cannot attack everything at once. In the problem of manufacturing defects, results were also somewhat unsatisfactory. In this case the trouble was the high cost of inspection. There was a desire to reduce inspection cost, but there was a lack of specific information indicating forcefully where inspection cost could be substantially reduced.

We began to realize then that the best approach to our problem would be the reverse of the standard approach. First we must analyze, and, where necessary, revise the final inspection procedures. Once this had been accomplished, we could then attack the problem of process controls with the objective of applying improved controls where needed. Finally, in those instances where it became evident

*Presented at Clinic No. 11, Fourth Annual Rochester Clinic, ASQC, Rochester, N. Y., February 17, 1948.

that the quality of incoming material was important, the problems of material acceptance could be attacked.

REVERSING THE STRATEGY

We started on the problems of final inspection procedures for measurable characteristics by making the specifications well-defined, in the modern sense. This simply means that we carefully defined what was meant by a lot, what the rejectable quality level would be, and the consumer's risk. Objections were raised at first, of course, when lots failed to pass the sampling plans. As time went on, however, the realization grew that such lots really should be rejected. It was then realized, as we had already known, that we were applying our quality assurances too late, and that we should go back to the processes and help to establish better controls.

This made the attack on the process controls much easier since there was now real motivation and resultant cooperation. Working closely with the engineers and foremen, we set up variables control charts at key points in the processes. Where good control was evident we reduced the frequency of test. Where control was poor we increased the frequency of test and increased the sample size for rechecks to fit, with a factor of safety, the rejectable quality level and consumer's risk as defined in the modernized specifications for finished products. The result of this action was to reduce materially the cost of test where quality was good and to increase it substantially where quality was poor. The increased cost and test burden where quality was poor provided an immediate incentive to "do something about it". Test costs have been analyzed, and we publish periodically charts showing the cost of test per thousand units manufactured, type by type. In some instances the cost of test per thousand units manufactured has reached a ratio as high as 50 to 1 between poor quality types and good quality types.

This method of reporting in the universal language of dollars and cents provides powerful motivation to improve the controls on the specific types offending. This could be done immediately without an increase in overall cost, for the new procedures reduced the test cost on the good types enough to pay for the increased cost on the poor types. As a consequence of the specific concentration of control effort, the types which were in poor control have been greatly improved, with the result that the overall test cost has been decreasing from its old level.

CURRENT PROCEDURES

As we studied the problems of final inspection procedures for manufacturing defects, it became evident that a poor sample drawn from a process with a good history was less likely to indicate a poor lot than would be the case if the process had a poor history. We therefore experimented with a plan of allowing high lot tolerance when the process history was good, low lot tolerance when the process history was poor. By repeated check inspections we found that this would not have an adverse effect on the quality level. Actually, our data show greater danger of passing a poor lot when history is poor and sample is good than when history is good and sample is poor.

We therefore set up a system of a simple classification of the product types by their past history. We have three classes, A, B, and C. Class A product types are those with a good history and are, therefore, inspected under a plan which provides a comparatively small sample, high lot tolerance, and very seldom requires detail inspection. Class C product types are those with a poor history and are inspected under a plan which provides a comparatively large sample, low lot tolerance, and frequent detail inspection. Class B product types are in between on each of these counts.

Class C product types have been subjected to a degree of inspection approximately equal to that of our previous Dodge-Romig plan, which was generally giving us adequate quality assurance. There has been considerable reduction in inspection cost on types in Class B, and substantial savings on types in Class A. Inspection costs have been analyzed, and we publish periodically charts showing the cost of inspection per thousand units manufactured, class by class. In some instances the cost of inspection per thousand units manufactured has reached a Class C to Class A ratio as high as 20 to 1.

This method of reporting directs attention specifically to the types in Class C first, and then to the types in Class B. Class A is considered the economic quality objective, and the types regularly in this class require no more trouble shooting, but only the proper maintenance of adequate controls. As a result of the specific concentration of control effort, there are no more types in Class C in many plants, and, in some plants, very few in Class B. Thus the overall inspection costs have been substantially reduced. At the same time, check inspection has shown an even better quality level resulting from the control of quality at the source.

In the problems of process control of manufacturing defects, we still find in many of our processes that quality control is as much an art as a science and that the important element here is not primarily the application of statistics, but rather properly directed action on the part of those who have the "know-how".

In the problem of material acceptance, there is now great interest in the extent to which quality of material affects process controls and the quality of finished products. We have sometimes had to check over-enthusiasm at this point to be sure that economic consideration justify the extent of material inspection requested.

CONCLUSION

These quality improvements and cost reductions are the fruit of intelligent and skillful hard work on the part of engineers and foremen. We have been very happy to find that whatever the direction of our attack on these quality control problems, we always get the by-product. When the object of our attack is improvement in quality we find that in getting better quality we also get reduced cost. When the object of our attack is the reduction of inspection cost, we find that we always get better quality. The key point in our thinking is that we must call attention to specific items, and thus help to direct the efforts of those who are in a position to do something about those items. Thus we keep our control efforts in proportion to control needs.

ANNOUNCING THE
Third Midwest
Quality Control Conference

HOTEL SHERMAN, CHICAGO, ILLINOIS

THURSDAY AND FRIDAY, NOVEMBER 4 AND 5, 1948

The nine midwest sections of the American Society for Quality Control are holding their Third Midwest Quality Control Conference at the Hotel Sherman in Chicago on November 4 and 5, 1948. The Conference is again being sponsored by the Chicago Association of Commerce and Industry.

Professor Lloyd A. Knowler of the State University of Iowa, Chairman of the Program Committee, has secured an excellent group of speakers for both the clinical and training sessions. Highlighting the Conference program will be the luncheon sessions, at which two top - ranking business executives will give down-to-earth talks on the benefits of statistical quality control applications in their plants.

On the first day, Mr. Charles D. Wiman, President of Deere & Company, will be the luncheon speaker, while the second luncheon meeting will feature Mr. Hugo A. Weissbrodt, Works Manager of the International Harvester's Fort Wayne Motor Truck Division.

Six training sessions, to be conducted largely on a laboratory basis, have been planned to give introductory instruction in the basic principles and techniques of control chart practice. These sessions will be directed by Professor Niles Barnard, Mechanical Engineering, University of Nebraska, and Professor John A. Henry, Mechanical Engineering, University of Illinois. They will have a battery of competent assistants to help them put the instruction on as nearly a person-to-person basis as possible during the laboratory work.

Under the general chairmanship of James M. Ballowe of Aldens, Inc., the Planning Committee has rounded out a well - balanced agenda for these two days that provides a challenging opportunity to learn about the techniques, applications, and advantages of statistical quality control in industry. Supplementing the formal program, the Conference will also feature many exhibits, where the latest devices for measurement and control will be demonstrated.

Conference Slogan

GREATER QUANTITY
BETTER QUALITY
LOWER COSTS

CONFERENCE PROGRAM

Thursday, November 4, 1948

9:00 A.M.

Registration—Mezzanine

All members and guests attending the Conference or any of its sessions are urged to register at the Conference Headquarters on the Mezzanine immediately upon arrival even though they may have secured their Conference tickets in advance.

10:00 A.M.

General Sessions

(1) SUBJECT: "Setting and Maintaining Tolerances Statistically"

SPEAKER: Warren E. Jones, Management Controls, Des Plaines, Ill.

MODERATOR: S. C. Amren, Assistant Chief Inspector, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

(2) SUBJECT: "Operator Interest and Cooperation in Statistical Quality Control"

SPEAKER: A. H. Becker, Product Control Manager, U. S. Rubber Co., Indianapolis Plant, Indianapolis, Ind.

MODERATOR: Colonel Edward Don, President, Edward Don & Company, Chicago, Ill.

Training Sessions

(1) SUBJECT: "Introduction to Statistical Quality Control." INSTRUCTOR: Professor John A. Henry.

(2) SUBJECT: "Modern Quality Control" — Johns-Manville color and sound training film.

MODERATOR: Simon Collier, Director of Quality Control, Johns-Manville Corp., New York, N. Y.

12:00 Noon

Luncheon—Grand Ballroom

SPEAKER: Charles Deere Wiman, President, Deere & Company.

SUBJECT: "Quality Control Stimulates Thinking."

2:30 P.M.

General Sessions

(1) SUBJECT: "How to Detect the Type of an Assignable Cause"—Part 1.

SPEAKER: Dr. Paul S. Olmstead, Technical Staff, Bell Telephone Laboratories, Murray Hill, N. J.

MODERATOR: Dr. J. N. Berrettoni, Consultant, Minneapolis, Minn.

(2) SUBJECT: "Statistical Quality Control in the Manufacture of Piston Rings"

SPEAKER: Carl E. Hoover, Quality Control Engineer, Perfect Circle Corp., Hagerstown, Ind.

MODERATOR: C. E. Fisher, Bell Telephone Laboratories, St. Louis, Mo.

Training Sessions

SUBJECT: "How the Control Chart Works."

INSTRUCTOR: Professor Niles Barnard.

4:10 P.M.

General Sessions

(1) SUBJECT: "How to Detect the Type of an Assignable Cause"—Part 2.

SPEAKER: Dr. Paul S. Olmstead, Technical Staff, Bell Telephone Laboratories, Murray Hill, N. J.

MODERATOR: Dr. J. N. Berrettoni, Consultant, Minneapolis, Minn.

(2) SUBJECT: "Quality Control Procedures in Relation to Time Study"

SPEAKER: Ray W. Good, Assistant Chief Inspector, Robertshaw-Fulton Controls Co., Youngwood, Pa.

MODERATOR: Wayne M. Biklen, Quality Control Engineer, W. A. Sheaffer Pen Co., Fort Madison, Iowa

Training Sessions

SUBJECT: "Interpretation of Process Control Charts"

INSTRUCTOR: Professor John A. Henry.

Friday, November 5, 1948

9:00 A.M.

(1) SUBJECT: "What is a Significance Test?"

SPEAKER: J. D. Heide, Research and Development Department, U. S. Rubber Co., General Laboratories, Passaic, N. J.

MODERATOR: Frank T. Pettit, General Foreman of Inspection, Caterpillar Tractor Co., Peoria, Ill.

(2) SUBJECT: "Sampling in an Uncontrolled Process"

SPEAKER: Dr. Carl E. Noble, Quality Control Engineer, Kimberly-Clark Corp., Neenah, Wis.

MODERATOR: Frank A. Palumbo, Palumbo and Associates, Chicago, Ill.

Training Sessions

SUBJECT: "Demonstration of Process Control Charts"

INSTRUCTORS: Professors Niles Barnard and John A. Henry, and staff.

10:30 A.M.

General Sessions

(1) SUBJECT: "Confidence Intervals"

SPEAKER: Professor Allen T. Craig, Department of Mathematics, State University of Iowa, Iowa City, Iowa

MODERATOR: R. S. Saddoris, Central Quality Control, A. O. Smith Corp., Milwaukee, Wis.

(2) SUBJECT: "Quality Control as Applied to the Manufacture of Pallet Stones from Synthetic Sapphire"

SPEAKER: Eugene A. Way, Quality Control Engineer, Elgin National Watch Co., Elgin, Ill.

MODERATOR: John K. Taggart, Eli Lilly & Company, Indianapolis, Ind.

Training Sessions

SUBJECT: "Practice in Construction of Process Control Charts."

INSTRUCTORS: Professors Niles Barnard and John A. Henry, and staff.

12:00 Noon

Luncheon—Grand Ballroom

SPEAKER: Hugo A. Weissbrodt, Works Manager, Fort Wayne, International Harvester Company.

SUBJECT: "Results Obtained Through Application of Statistical Quality Control"

2:30 P.M.

General Sessions

(1) SUBJECT: "Quality Control as Applied to High Production"

SPEAKER: Kort K. Pfabe, Assistant Factory Manager, Carter Carburetor Corp., St. Louis, Mo.

MODERATOR: E. J. Cade, General Electric Company, Fort Wayne, Ind.

(2) SUBJECT: "Quality Control—A New Chemical Engineering Tool"

SPEAKER: Dr. George N. Cornell, Chief Chemical Engineer, A. E. Staley Manufacturing Co., Decatur, Ill.

MODERATOR: Henry J. Becker, Division Metallurgist Quality Control, American Steel & Wire Co., Waukegan, Ill.

Training Sessions

SUBJECT: "Additional Control Chart Techniques"

INSTRUCTORS: Professors Niles Barnard and John A. Henry.

4.30 P.M.

Adjournment of Conference

Thursday evening, November 4, will be reserved for section meetings of the midwest quality control societies and for committee meetings of the American Society for Quality Control.

Cost: The price for a full, two-day conference ticket is $15. This includes both luncheon meetings as well as all general or training sessions of the Conference. Requests for tickets must be accompanied by remittance in full, payable to the Chicago Association of Commerce and Industry.

Hotel Reservations should be made directly with the Hotel Sherman.

Applications for tickets and requests for information should be addressed to

Third Midwest Quality
Control Conference
P. O. Box $1097
Chicago 90, Ill.

NOTICE

The Post Office Department does not forward ICQ to a forwarding address . The magazine is delivered to the address on file with the Executive Secretary. **If you make a change of address and expect to get your copy of IQC, see that prompt notice of the new address is sent to**

Simon Collier
Executive Secretary, IQC
22 East 40th Street
New York 16, N. Y.

IOWA COURSE

A ten-day intensive training course in **Quality Control by Statistical Methods** will be offered by The State University of Iowa at Iowa City, October 5-15, 1948. This will be an introductory (not an advanced) course which will follow the same general pattern of previous introductory courses.

The tuition fee of $100 per person includes all necessary instructional materials. Room accommodations will be available at the Jefferson Hotel in Iowa City. Reservations should be made by direct correspondence with the hotel. Further inquiries concerning this course should be addressed to: Professor Lloyd A. Knowler, Chairman, Department of Mathematics, The State University of Iowa, Iowa City, Iowa.

ANNUAL REPORTS

At the Annual Meeting of the Society in New York on 17 June, 1948, the President, the Executive Secretary, and the Treasurer presented Annual Reports on behalf of the Board of Directors. These Reports were duly accepted. They have been extended to include the balance of the fiscal year, in accordance with the provisions of Sections **29. c.** (3), **29. d.** (5), and **33. h.** of the Constitution, and are published in full below.

REPORT OF BOARD OF DIRECTORS

The Board of Directors of the American Society for Quality Control, Incorporated, presents herewith to the membership its second Annual Report, covering the fiscal year from 1 July, 1947 through 30 June, 1948. This report includes a brief summary of the principal activities of the Society during the period covered, more detailed information having been given to the membership in the several issues of Industrial Quality Control which have been published in the course of the year.

Appended to this Report are the Annual Reports of the Executive Secretary and of the Treasurer, setting forth respectively, the status of the membership roll and of the roll of Sections, and the financial condition of the Society, as of the close of the fiscal year. The Auditing Committee's certification of the Treasurer's Report is also appended.

Board of Directors' Meetings

Only one meeting of the Board was held during the period,—in Rochester on 16 February, 1948. Twenty-five members of the Board were present.

Important action taken at this meeting included:

1. Confirmation of action of the Executive Committee in recognizing the following as Sections of the Society:
   Washington
   Baltimore
   Tennessee
   Minnesota
   Dayton
   Mid-Hudson
2. Withdrawal of the privileges of the Omaha group as a Section of the Society.
3. Approval of an interim report of the Shewhart Medal Committee, and authorization to that Committee to proceed with its proposal that it undertake itself to raise the funds necessary to finance the Shewhart Medal project.

The Board directed that the general procedure to be followed in the raising of such funds, be approved by the Constitution and By-Laws Committee as within the intent of the Constitutional provision against direct solicitation of funds for the Society.

Executive Committee Meetings

Four meetings of the Executive Committee were held during the year as follows:

Endicott, 13-14 September, 1947
Rochester, 6-7 December, 1947
Rochester, 15 February, 1948
New York, 17 June, 1948

All of these meetings were given over to general discussions and decisions with respect to Society activities and plans. Their proceedings have largely been reported in succeeding issues of Industrial Quality Control, and will not be repeated here.

In addition to these formal meetings, the officers have been in frequent consultation and discussion with various other members of the Executive Committee throughout the year, in connection with important Society matters.

Sections Visited by President Edwards

Middle Atlantic Region:
Baltimore,
Delaware,
Metropolitan.
Northern Region:
Rochester.
Central Region:
Dayton,
Ohio.
Mid-West Region:
St. Louis.

In addition to speaking at meetings of most of the above Sections, the President also spoke at the Second National Convention of the Society in Rochester.

Annual Meeting

The annual business meeting of the Society was held in New York City on 17 June, 1948. The proceedings of the Annual Meeting are recorded in some detail elsewhere in this issue of Industrial Quality Control, and will not be repeated here.

Officers elected for the fiscal year 1948-49 were as follows:

President: Ralph E. Wareham
Vice-President: Wade R. Weaver
Executive Secretary: Simon Collier
Treasurer: Alfred L. Davis

National Convention

The second Convention of the Society was held in Rochester on the 16th and 17th February, 1948, in conjunction with the Fourth Annual Quality Control Clinic of the Rochester Section. The proceedings of the Convention were reported in some detail in the March, 1948 issue of Industrial Quality Control, and no detailed report will be given here. Its outstanding success was due largely to the devotion and hard work of the Rochester Section members and Committees who played host to the Society.

Two large Regional meetings were held during the year:

Middle Atlantic
Princeton, N. J.
6 December, 1947

New England
Boston, Mass.
22 January, 1948

Each of these meetings was sponsored by all of the American Society Sections in its Region. In addition to luncheon and dinner sessions of a more general character, each meeting included a number of "clinical" sessions devoted to exposition of specific phases or applications of quality control. Both meetings were highly successful and contributed substantially to an increase in quality control enthusiasm in their respective Regions.

Section Meetings

All of the Society's thirty Sections held well-attended meetings more or less regularly during the year.

Technical sessions were frequently preceded by a less formal dinner session. Two of the Sections also held all-day meetings with "clinical" sessions as follows:

St. Louis
St. Louis
21 November, 1947

Michigan
Detroit
4 June, 1948

Section meetings constitute a substantial and important contribution to the life of the Society, and to the gain which accrues to individual members from the Society. It is to be hoped that these Section activities will increase in scope and strength with the continuing growth of the national organization.

Sections

Last year, the Board reported twenty-five active Sections of the Society. During this year, seven new Sections have been recognized and the charter of one has been withdrawn, so that the Society now comprehends thirty-one active Sections. The newest of the latter,—the Rock River Valley Section in Rockford, Illinois,—was accorded recognition at the Executive Committee meeting on 17 June, 1948.

Membership

The matter of membership renewals gave your Executive Committee grave concern throughout the first half of the fiscal year. At the end of the first two months of the year, only 10% of last year's members had renewed, and seven months of the year had passed before renewals reached 50%. At that time, total membership, including new members, was less than 60% of last year.

Fortunately as the result of most effective effort by the Membership Committee, by a number of the Regional Directors, and by the Executive Secretary, renewals and new memberships have come in in goodly numbers since 1 February. Your Executive Secretary is thus able to report to you a very substantial and satisfactory increase in total membership over last year.

The budget set up by the Executive Committee contemplated that one-half of the total membership would be in the Senior Member and Fellow grades. Actual occomplishment has been 46%. The budgeted membership has been exceeded in each grade however, so that total receipts from dues have been substantially in excess of the budgeted figure.

From the points of view both of total membership and of the proportion in the higher grades, there appears every reason for satisfaction with the present situation. The Board is only concerned about the difficulty of maintaining equally satisfactory showings of growth in future years.

Members-In-Training

In the course of the year, the Executive Committee approved rather restricted temporary rules under which Members-In-Training could be enrolled under the provisions of the constitution. Six enrollments have been made under these rules. The Committee on Constitution and By-Laws has since made specific recommendations for a permanent By-Law covering such enrollments. It is expected that this can be duly adopted during the coming year, and that some increase in such enrollments will result.

Properly handled, these Members-In-Training should prove an important source of new members for the Society each year.

Industrial Quality Control

Under the able and self-sacrificing chairmanship of Professor Mason Wescott, the Editorial Board has maintained the magazine on a 32-page basis throughout the year and has steadily improved the calibre of its technical content. Despite labor and other difficulties, substantial improvement has been accomplished in the promptness with which the issues have appeared, and further improvement along these lines is anticipated during the coming year.

The appeal of the magazine to Libraries and other institutions is continuing to show growth,—the number of institutional subscriptions now being approximately 200.

The Supplement to Industrial Quality Control, under the able editorship of Mr. Ernest H. Robinson, has appeared throughout the year in those months when there is no issue of the magazine itself. A valuable new feature of the Supplement is the bi-monthly tabulation of future Section meetings. Non-uniform promptness of Section Secretaries in notifying Mr. Robinson of meetings and other Section news has made the Supplement of less value than it could otherwise be. It is hoped that this situation will improve during the coming year.

Advertising

With the high-grade circulation of Industrial Quality Control, and of its Supplement, now well in excess of 2250, your Executive Committee is convinced that it should offer real appeal to commercial advertisers of acceptable character and that such advertising should provide an important source of income to the Society.

The Executive Committee has accordingly approved the President's appointment of Mr. Edward D. Thompson to head up a special committee for the procurement of such advertising. The magazine is now carrying three full-pages of commercial advertising along with a number of smaller commercial insertions in each issue, and Mr. Thompson's Committee hopes to increase this total substantially in the not-too-distant future.

In the course of the year, the Committee on Professional Ethics and Qualifications recommended conditions under which corporate members of the Society, acting as technical consultants on quality control matters, could insert business-card announcements in Industrial Quality Control. These recommendations were subsequently approved by the Executive Committee with minor modifications, and advertising of this character is now being accepted regularly.

At the same time, the Executive Committee approved acceptance of "Situations Wanted" advertising from corporate members under certain restrictions, as well as "Help Wanted" advertising in general under similar restrictions.

Standing Committees

During the year, the Examining Committee, under the able Chairmanship of Dr. Paul S. Olmstead, has been activated under the provisions of the new constitution. It

has so far devoted practically its entire attention to the matter of transfers to the Fellow grade of membership. Recognizing the necessity of maintaining a high professional standard in such transfers, the Committee has established extremely careful rules of procedure and analysis in connection with its approval of each transfer. As a result, a considerable backlog of applications for transfer has accumulated. In some cases, the Committee has concluded from the evidence presented, that applicants were slightly deficient in experience but would probably qualify in a fairly short time. In such cases, the Committee has deferred consideration for the period indicated. A total of 38 applications have been cleared so far and these transfers have been effected.

Action of the Committee on Professional Ethics and Qualifications in connection with Professional Consultant Advertising has already been reported upon. This Committee has also completed during the year, and recommended to the Board of Directors for adoption, a complete Code of Ethics for the Society. The Code was duly adopted by the Board by postal ballot on 5 January, 1948, and all members of the Society are now obligated under the constitution to be guided by its principles.

Action of the Committee on Constitution and By-Laws has already been reported in connection with the recommendation of a By-Law covering Members-in-Training. This Committee has also rendered an advisory opinion for the guidance of the Shewart Medal Committee in its procurement of funds for the financing of its project.

After careful canvass of its problem, the Nominating Committee submitted to the Executive Secretary the following nominations for officers for the fiscal year 1948-49;

For President
Ralph E. Wareham

For Vice-President
Wade R. Weaver

For Executive Secretary
Simon Collier

For Treasurer
Alfred L. Davis

In the postal ballot terminating at the Annual Meeting, the above nominees were all elected by large majorities as already reported.

With the approval of the Executive Committee, the Auditing Committee has retained the firm of Ernst & Ernst to make the annual audit of the books and records of the Treasurer. The results of this work are set forth in the certification appended to the Annual Report of the Treasurer.

Technical Committees

The newly activated Standards Committee, under the able chairmanship of Mr. Harold F. Dodge, has so far confined its activities to a general survey of its field and the delimitation of general policies to be followed in standardization. This is work which must proceed with caution, clarity and positive assurance. It is hence not surprising that there is little yet to report in the way of concrete progress.

Special Committees

Reference has already been made to the work of the Shewart Medal Committee. As a result of the well-planned and tireless efforts of its Chairman, Mr. Philip L. Alger, a substantial portion of the funds necessary to finance this project is already in hand or underwritten. Through announcement in the July issue of Industrial Quality Control, all members of the Society have been given opportunity to subscribe to the Fund before it is closed, in order that the Fund may really include gifts from a representative cross-section of the membership of the Society. It is fully expected that all necessary funds for proceeding with the project will be in hand before the end of the present calendar year.

The work of the newly-activated Advertising Committee has already been fully reported upon.

General Committees

The Vice-President of the Society, Mr. Frederick J. Halton, Jr., has acted throughout the year as General Chairman of all of the General Committees. In this capacity, he has been most effective and tireless in coordinating and dovetailing their various activities, and in guiding and aiding a number of their individiual projects.

Under the hard-working Executive Chairmanship of Mr. Jerome R. Steen, the Committee on Membership was of untold value and aid in meeting the membership renewal problem already referred to. Out of this effort came valuable experience which it is believed will be of real aid to the Committee in its work during the forthcoming and future years.

During the past year, the Committee on Programs and Speakers, under the Executive Chairmanship of Mr. Frank A. Palumbo has compiled a complete list of all speakers who have appeared before local Sections, together with the subjects of their several talks. This list has been made available to all Sections. This Committee will be glad to be of advisory aid to Sections in connection with the arrangement of their meeting programs, as well as in connection with the planning of Regional programs, etc.

The Committee on Publicity and Public Relations, under the Executive Chairmanship of Mr. Ernest H. Robinson, has continued throughout the year discreet effort to secure publicity of the right sort both for quality control in general and for the American Society in particular. Favorable notices regarding the Society, as well as regarding quality control, have appeared in several of the better-known technical and business magazines having national circulation, and in a considerable number of newspapers both of local and of wider circulation. This Committee has also secured reprints of several of these articles, and has made these available at the National Convention, at Regional Meetings and at some of the larger meetings of local Sections.

The Committee on Relations with Educational Institutions has continued and followed up the general program which it launched so auspiciously last year. Both the main Committee, under the Executive Chairmanship of Mr. A. C. Richmond, and its Sub-Committee on College Courses under Professor John A. Henry as Chairman, have been active throughout the year. Projects now under way include: the working up of a complete list of all in-term college courses in quality control now being offered as part of regular college curricula in the United States; and the compilation of a running calendar of non-periodic short intensive courses in quality control being offered by colleges and universities through-

out the country. It is quite possible that the calendar last mentioned may find a regular place in the Supplement to Industrial Quality Control, along with the present calendar of local Section meetings.

Under the able Executive Chairmanship of Mr. A. G. Ashcroft, the Committee on Relations with Other Technical Societies has continued to foster joint activities calculated to bring the advantages of quality control to the attention of the membership of other technical organizations. While no joint meetings on a National or Regional level have been arranged this year, a number of successful joint meetings on a local level have been arranged. As a result of the joint meeting on a national level held last year with the American Institute of Electrical Engineers, the A.I.E.E. has requested further cooperation, and this Committee has appointed a Sub-Committee on A.I.E.E. relations under the Chairmanship of Dr. Paul S. Olmstead. This Sub-Committee is cooperating with an A.I.E.E. Sub-Committee on Quality Control in arranging for jointly sponsored quality control papers at various A.I.E.E. meetings throughout the country.

Year-Book

The Board regrets the lateness of the 1947-48 Year-Book. Piling of one delay on another was climaxed by the discovery of a substantial number of errors of omission and commission in the Society's membership records. It is believed that most of these errors have been cleared in the Year-Book, though it is known that at least a few of them remained to be cleared at the time it was released to the printer. The Board begs the indulgence of the membership, and trusts the members will bear with the situation until all errors can be corrected.

Sustaining Contributions

The Board is sure that the entire membership will be more than grateful to each of the goodly number of Sustaining Contributors to the Society listed in the 1947-48 Year-Book. This Report would not be complete without special mention of such contributions falling in two particular categories.

The first of these is the very substantial total already mentioned as received for underwriting the cost of the Shewart Medal. This total already represents the gifts of an important number of members and friends of the Society, and it is hoped that it will ultimately include at least token contributions from a truly representative cross-section of the entire membership.

In the second category is a generous contribution of $2000 from the Rochester Society For Quality Control. Coming in part from its masterful handling of the Second Convention of the American Society, and in part from its own treasury, this gift from the Rochester Section constitutes the largest single contribution so far received from any source for the support of the Society's work. It will certainly be of untold aid in supporting the services of the Society to its entire membership and to quality control in general.

In making this gift, the Rochester Section has made a suggestion the entire appropriateness of which is so obvious that the Executive Committee has been more than pleased to take immediate steps to effect its adoption.

It is proposed to set aside an appropriate portion of the Rochester Section's gift for the support of a cash award to be made each year to the author of that paper published in Industrial Quality Control and judged, to have made the greatest contribution to the development or industrial application of quality control. This award is to be known as the Martin A. Brumbaugh Award, in honor of that distinguished Fellow of the Society who founded its magazine in 1944, who published and edited the magazine almost soley by his own efforts during the first several years of its existence, and who served as the first Chairman of the Society's Editorial Board.

The Executive Committee has authorized the President of the Society to appoint a Brumbaugh Award Committee to formulate recommendations covering matters involved in the setting up and administration of the Award. Following approval of these arrangements by the Executive Committee, the Brumbaugh Award Committee is to proceed to administer the Award in accordance with them.

Appreciation

Again, the Board of Directors expresses its deep appreciation to the ASQC Committees, to the Regional, Executive, and General Chairmen of those Committees, to Section officers, and to the members in general, for the loyal and effective effort which all have devoted to the advancement of the Society and of its aims. The Board extends its thanks to all of these for the splendid cooperation and support which it has uniformly received.

For the Board of Directors
GEORGE D. EDWARDS,
President.
New York City, 30 June, 1948

REPORT OF EXECUTIVE SECRETARY

At the end of the Society's first fiscal year on June 30, 1947, there were 25 active Sections of the Society and a total membership of 1926. Of these 1926 members, 243 had joined as Founding Members of the Society.

During the 1947-48 fiscal year, membership has expanded to a present total of 2098 in 31 active Sections of the Society. One of these Sections, the Rock River Valley Section, has just been recognized and has not yet enrolled any national members directly.

New Sections recognized during the 1947-48 fiscal year were: Washington, Baltimore, Tennesee, Minnesota, Dayton, Mid-Hudson, and Rock River Valley. The Omaha Section became inactive during the year.

The membership of the Society at June 30, 1948 was composed as follows:

Fellows	39*
Senior Members	927
Members	1126
Total Membership	2092
Members in Training	6
Total	2098

*Includes one Honorary Member

The attached Exhibit A shows the membership of the Society as of June 30, 1948 by Region and by Section, indicating the number of Fellows, Senior Members, and Members in each Section. The Chicago Section (with 185 members) is the largest Section in the Society. The Mid-West Region is the largest Region with 588 members.

The Western Massachusetts Section, with two and one-half times as many members, has had the greatest growth during the past year. The Central Region has shown the largest regional growth during the year, with 5 Sections at the end of the year as compared with 3 at the beginning, and with 317 members as compared with 191 in the previous year.

The steady growth of membership and interest in quality control, since the formation of the Society in February, 1946, has been a constant source of encouragement to the officers and committees.

Respectfully submitted,
RALPH E. WAREHAM
Executive Secretary

REPORT OF TREASURER

Appended hereto are Balance Sheet of the Society as of June 30, 1948 (Exhibit B), and Statement of Cash Receipts and Disbursements of the Society for the fiscal year July 1, 1947 through June 30, 1948, inclusive (Exhibit C).

Respectfully submitted,
ALFRED L. DAVIS
Treasurer

REPORT OF AUDITING COMMITTEE

With the approval of the Executive Committee, Ernst & Ernst, Certified Public Accountants, were retained to audit the books of the American Society for Quality Control, Inc. Relying on this audit and the attached certificate of Ernst & Ernst, we are of the opinion that the accompanying Balance Sheet and Statement of Cash Receipts and Disbursements fairly present the financial position of the Society as of June 30, 1948, and its operations for the fiscal year ending that date.

Auditing Committee
HOWARD L. JONES, Chairman
HOWARD L. BOLTON
G. RUPERT GAUSE
PAUL A. ROBERT
JOSEPH SADOWSKI

CERTIFICATE OF AUDIT

American Society for Quality Control, Incorporated

We have examined the balance sheet of the American Society for Quality Control, Incorporated, as of June 30, 1948 and the statement of cash receipts and disbursements for the year then ended, and, without making a detailed audit of the transactions, have examined or tested accounting records maintained by the Treasurer of the Society, and other supporting evidence, as hereinafter outlined.

Cash on deposit at June 30, 1948 was reconciled with amount reported to us by Lincoln Rochester Trust Company. We traced the recorded cash receipts for the fiscal year to deposits shown by bank statements, inspected reports made by the Executive Secretary supporting amounts recorded as having been received for membership dues, and tested other data on file supporting other recorded cash receipts. We also inspected cancelled bank checks, invoices, payrolls, and other data in support of the recorded disbursements for the year.

We examined data and checked computations supporting amounts shown in the balance sheet, for accounts receivable, accounts payable, and deferred income at June 30, 1948.

In our opinion, based on our examination as outlined above, the accompanying balance sheet and statement of cash receipts and disbursements present fairly the position of American Society for Quality Control, Incorporated, at June 30, 1948 and recorded cash transactions of the Society for the year then ended.

ERNST & ERNST

July 27, 1948
Buffalo, N. Y.

EXHIBIT A

American Society for Quality Control, Inc.
Membership Report as of June 30, 1948

	Membership at June 30, 1947	Membership at June 30, 1948			
		Members	Senior Members	Fellows	Total
New England Region					
Boston	124	49	49	1	99
Hartford	36	21	15	0	36
Southern Connecticut	47	26	32	1	59
Western Massachusetts	18	15	30	0	45
TOTAL	225	111	126	2	239
Middle Atlantic Region					
Baltimore	—	8	5	0	13
Delaware	42	21	11	1	33
Metropolitan	160	58	87	13	158
Philadelphia	98	31	48	2	81
Washington	—	12	7	0	19
TOTAL	300	130	158	16	304
Northern Region					
Buffalo	113	62	17	1	80
Michigan	100	76	6	1	83
Mid-Hudson	—	21	8	0	29
Rochester	120	63	46	1	110
Southern Tier	60	39	16	0	55

EXHIBIT A
(Continued)

	Membership at June 30, 1947	Membership at June 30, 1948			
		Members	Members	Fellows	Total
Syracuse	68	55	40	2	97
Toronto	28	28	2	1	31
TOTAL	489	344	135	6	485
Central Region					
Dayton	—	1	40	0	41
Georgia	31	4	20	0	24
Ohio	98	90	62	2	154
Pittsburgh	62	50	16	1	67
Tennessee	—	19	12	0	31
TOTAL	191	164	150	3	317
Mid-West Region					
Chicago	198	59	123	3	185
Illinois	42	9	19	1	29
Indiana	41	48	38	1	87
Iowa	88	31	49	4	84
Milwaukee	71	37	22	0	59
Minnesota	—	14	4	1	19
North Eastern Indiana	43	38	4	0	42
St. Louis	49	51	32	0	83
Omaha	7	—	—	—	—
TOTAL	539	287	291	10	588
Western Region					
California	67	21	13	1	35
At- Large	115	69	54	1	124
GRAND TOTALS	1926	1126	927	39	2092

EXHIBIT B
AMERICAN SOCIETY FOR QUALITY CONTROL, INC.
Balance Sheet — June 30, 1948

Assets		
Cash on deposit:		
Current fund	$7,027.24	
Shewhart Medal Fund	885.00	$7,912.24
Accounts receivable:		
Advertising space in publication	$ 156.67	
Sale of back issues of publications	1.35	
Sale of Conference Papers	14.00	
Library subscriptions	27.50	199.52
Inventories:		
Back issues and reprints of publications — at nominal amount	$ 1.00	
Stationery — at nominal amount	1.00	2.00
		$8,113.76
Liabilities and Surplus		
Accounts payable:		
For estimated cost of publication of year book	$1,800.00	
For sundry expenses	322.73	
Income tax withheld from salaries	133.69	$2,256.42
Deferred income:		
Membership dues paid in advance	$ 164.00	
Library subscriptions paid in advance	327.98	491.98
Reserve:		
For cost of Shewhart Medal		885.00
Surplus		4,480.36
		$8,113.76

EXHIBIT C

AMERICAN SOCIETY FOR QUALITY CONTROL, INC.

Statement of Cash Receipts and Disbursements

Year Ended June 30, 1948

Receipts			
Membership dues:			
Members in training	$ 15.00		
Regular members	4,325.68		
Senior members	7,100.00		
Fellows	357.00	$11,797.68	
Less refunds of overpayments		246.50	$11,551.18
Sales of Mid-West Conference Papers		$ 721.00	
Less amount remitted to sponsoring sections		640.50	80.50
Sustaining and Founding contributions			2,212.50
Publications.			
Advertising		$ 2,324.41	
Library subscriptions		1,005.50	
Sales of back issues		1,087.00	4,416.91
Contributions to Shewhart Medal Fund			885.00
Sales of emblem cuts and miscellaneous			41.37
TOTAL RECEIPTS			$19,187.46
Disbursements			
Publications:			
Publishing—magazine		$ 4,517.96	
Publishing—news supplement		667.39	
Reprinting—back issues		146.00	
Mailing—envelopes, labels, etc.		526.66	
Postage		507.63	
Secretarial services		323.21	
Advertising commissions and cash discounts allowed		452.27	
Traveling expense		54.18	
Miscellaneous		156.00	$ 7,351.30
Sections and Committees:			
Printing costs—stationery, reprints, etc.		$ 287.75	
Postage and mailing		17.54	
		$ 305.29	
Less reimbursed by Sections		68.25	237.04
President:			
Postage and stationery		$ 119.93	
Telegraph		29.46	
Miscellaneous supplies and expense		54.69	204.08
Executive Secretary:			
Secretarial salaries		$ 2,474.85	
Printing and mimeographing		1,095.83	
1946-1947 Year-Book		1,023.15	
Postage		230.95	
Telephone and telegraph		33.58	
Traveling expense		173.74	
Miscellaneous supplies and expense		310.77	$ 5,342.87
Treasurer:			
Secretarial salaries		$ 1,013.80	
Postage		65.87	
Bond premium		18.75	
Bank collection and exchange fees		14.05	
Traveling expense		46.75	
Miscellaneous supplies and expense		65.96	1,225.18
TOTAL DISBURSEMENTS			$14,360.47
Cash receipts in excess of cash disbursements			$ 4,826.99
Cash on deposit at July 1, 1947			3,085.25
CASH ON DEPOSIT AT JUNE 30, 1948			$ 7,912.24

AMERICAN SOCIETY NEWS

ANNUAL MEETING — 1948

The second Annual Meeting of the American Society for Quality Control was held in the Engineering Societies Building in New York City on Thursday evening, 17 June, 1948.

President Edwards called the meeting to order at 8:00 P.M. and immediately appointed:

Messrs. J. F. Andrews
K. W. Halbert
P. B. Proctor
H. G. Romig
C. J. Tantillo

to act as the Committee of Tellers for the election of officers for the coming year.

Executive Secretary Wareham reported that 2021 postal ballots had been sent out to the membership, and that 721 of these had been returned to him up to the time of the meeting.

The President inquired whether there were any members present who had not voted by mail and who wished to cast their ballots in person. The Executive Secretary distributed ballots to 7 such members, and these were collected in due course by the Tellers. The Executive Secretary then turned over to the Tellers the 721 ballots which had been cast by mail, and the Tellers retired to make their tally.

The President then presented, on behalf of the Board of Directors, a Report on the progress and accomplishments of the Society during the current fiscal year. This Report, extended to include the balance of the fiscal year, is printed in full elsewhere in this issue of the magazine.

The Executive Secretary presented, on behalf of the Board of Directors, a report on the general status of the Section and Membership Rolls, showing 30 Sections and 2063 corporate members in good standing. Of the total corporate membership, 38 were Fellows, 920 were Senior Members and 1105 were Members.

Treasurer Davis presented, on behalf of the Board of Directors, a summary income and expense report showing a balance of $8182.40 on hand as of 10 June, 1948. He also presented an estimated balance sheet, as of 30 June, 1948, showing a net excess of assets over liabilities of $5654.-02. It was noted that the stocks of reprints and back issues of the magazine were carried at the nominal value of $1.00 in this balance sheet.

On motion duly made and seconded, the reports presented by the President, the Executive Secretary and the Treasurer were ordered accepted as submitted. The President announced that the three reports would be extended to cover the balance of the fiscal year, as required by the Constitution, and would then be published in the September issue of Industrial Quality Control.

The Committee of Tellers having notified the Chair of their readiness to report, the President requested Dr. Romig, as their Chairman, to read their report to the meeting. The report was as follows:

Total Ballots Cast by Mail		721
Total Ballots Cast In Person		7
Total Ballots Cast		728
Disqualified Ballots	3	
Invalid Ballots	2	
Total Disqualified & Invalid Ballots		5
Net Qualified & Valid Ballots		723
Vote For President		
For Ralph E. Wareham		721
Not Voted		2
Vote For Vice-President		
For Wade R. Weaver		717
Not Voted		6
Vote For Executive Secretary		
For Simon Collier		713
Not Voted		10
Vote For Treasurer		
For Alfred L. Davis		719
Not Voted		4

The Chair accepted the report of the Committee of Tellers, and discharged them with the thanks of the Society.

Messrs. Wareham, Weaver, Collier and Davis, each having received a plurality of the valid ballots cast for the several offices involved, were declared, by the President, duly elected or reelected to the respective offices for which they had been nominated for the fiscal year beginning 1 July, 1948.

There followed a somewhat extended discussion of the democratic soundness of the procedure followed in conducting the election of officers. This discussion has been deemed of such interest and importance to the membership as a whole, that it has been reported in some detail elsewhere in this issue of the magazine.

There being no further business to come before the meeting, and no further meetings being contemplated before the close of the fiscal year, Mr. Wareham was then asked to step to the platform where Mr. Edwards congratulated him on his election, affixed the President's badge to his lapel, and presented him with the gavel of the Society.

In reply, Mr. Wareham paid high tribute to Mr. Edwards' "masterful guidance of the Society as its President during the first two and a third years of its life," and asked for continuance, for the new Officers, of the same undivided support which had been accorded by the Society to the outgoing administration. He thanked the membership for the honor it had bestowed upon him, and pledged his every effort, as its President, for the continued success of the Society. The meeting arose in applause.

Mr. Weaver having found it impossible to get to New York for the meeting, the President requested the Executive Secretary to notify him formally by mail of his election as Vice-President.

Mr. Edwards then asked Mr. Collier, and Mr. Davis, as Executive Secretary-elect and Treasurer-elect respectively, to rise in turn, and each received a round of applause.

Mr. Edwards thereupon adjourned the business portion of the session, and turned the meeting over to Mr. Collier who presented the Johns - Manville color - sound - picture entitled "Modern Quality Control." The film was highly enjoyed by everyone present. At its conclusion, President Edwards thanked Mr. Collier and the Johns-

Manville Corporation on behalf of the Society, for their great kindness in making the film available.

Final adjournment of the meeting left everyone with the feeling that the evening had been a highly interesting and profitable one, that much had been accomplished by the Society during the past year, but that the success of the Society will demand equal if not greater efforts from the new Officers and Directors during the coming year.

ASQC ELECTIONS
DISCUSSION AT ANNUAL MEETING

As reported elsewhere in this issue of Industrial Quality Control, there was a somewhat extended discussion, at the 1948 Annual Meeting, of the democratic soundness of the procedure followed in conducting election of ASQC officers.

The discussion was initiated by Dr. Pabst of the Washington Section, who pointed out that only one nomination had been made for each office and that the ballot did not provide space for the writing in of names of additional candidates for whom members might wish to vote. He questioned, in his mind, whether this method of conducting elections was r e a l l y "democratic."

The Chair then recognized Mr. Alger of the Syracuse Section. Mr. Alger observed that the practice of Nominating Committees, involving designation of a single nominee for each office, was uniform in all of the Founder Engineering Societies, (American Institute of Electrical Engineers, American Society of Mechanical Engineers, American Institute of Mining and Metal. i-cal Engineers, and American Society of Civil Engineers), and that, so far as he knew, it was followed by all of the larger societies of this character h a v i n g memberships widely distributed geographically. He stated that the practice had arisen because of the embarrassment and real difficulty experienced by Nominating Committees in persuading members of their choice to accept nomination if those Committees had in mind choosing other nominees to run for the same office against them. So many of the best candidates for office had thus been lost to the societies, that Nominating Committees had gradually, over the years, been forced to give up the practice of dual or multiple nominations for the same office. Mr. Alger saw nothing undemocratic about single nominations so long as the avenue of nomination-by-petition remained open. At the same time Nominating Committees are unhampered in persuading members, in their judgment best qualified, to accept nomination for office.

A third member secured the floor to support Dr. Pabst's point of view that the procedure being followed was undemocratic. A fourth member observed that the By-Laws of the American Society for Testing Materials did not even permit the Nominating Committee to designate more than one nominee for each office, but that a democratic election was assured by another By-Law providing for additional nominations by petition.

President Edwards took the floor at this point to emphasize that the Constitution of the American Society permitted the Nominating Committee to designate as many nominees as it wished for each office. He pointed out that the Society's very first Nominating Committee had last year encountered precisely the difficulty which Mr. Alger had described, and had found it necessary to limit itself to one nominee for each office. Apparently the second Nominating Committee had this year found the same practice desirable.

Mr. Edwards observed that the duty of the Nominating Committee was not limited to finding able nominees willing to serve, but it must be convinced that these nominees, if elected, would be able and willing to put the time and effort on the work necessary to do the job satisfactorily for the success of the Society. The number of eligible candidates meeting both of these requirements is extremely limited. The Society is able to afford so little paid help that every one of the elective offices requires literally enormous amounts of time from the incumbent personally. This was a factor almost always lost sight of in the popular conception of availability for office.

In discussing the matter of democratic procedure, Mr. Edwards cited Section **55.** of the Constitution which permits independent nominations for any office by petition of as few as 25 corporate members in good standing. Provision is made for appearance of the names of such independent nominees, if eligible for election, on the ballot along with those of the Nominating Committee. This Section of the Constitution appeared to him to guarantee a democratic election.

With respect to the lack of provision for write-in votes, Mr. Edwards pointed out that such write-in votes were permitted in the 1947 election. Out of 791 valid ballots cast in that election, the most write-in votes for any single office were 11. Out of the 3144 votes for the four offices, only 22 were written in and these were for 19 different candidates. Sixteen of those 19 candidates received only one vote each, one received two votes, and one received three votes. Mr. Edwards' point was that none of the written-in candidates had any c h a n c e whatever of election against a candidate whose name was printed on the ballot, and that the only way election of such a candidate could possibly be secured lay in nominating him by petition so that his name would be printed on the ballot.

Mr. Edwards observed that any or all of the 19 candidates written in on the ballots last year might have refused office even if elected, and that one of them was actually delinquent in his dues and hence ineligible to election. The time required of the Tellers to count and tabulate the vote was estimated at easily double what it would have been with two or three nominations printed on the ballot and no write-ins, and perhaps three or four times what it would have been with only one name printed on the ballot and no write-ins. All of the other large and widely-scattered societies had had precisely similar experiences with write-in ballots, and practically all of them had adopted the procedure ASQC is following. This experience was available to the Constitution and By-Laws Committee at the time the Constitution was drafted in 1946. It had led that Committee to include the present procedure in the Constitution which was adopted by the Society last year by a vote of 739 to 12.

Mr. Edwards pointed out that it was this procedure which enabled the Committee of Tellers to report so promptly at the Annual Meeting this year, and thus not unduly to delay the meeting. He could readily picture a situation in which write-in ballots might force the Annual Meeting to remain in session for hours, with none of the write-in candidates having any chance whatever of election, with at least some of them unwilling to accept election, and some even ineligible to election. He could not picture this as fair either to the Committee of Tellers, to those attending the Annual Meeting, to the Nominating Committee, or to those who had permitted their names to be placed in nomination.

A fifth member asked recognition at this point to observe that the weakness of the present procedure did not lie in the absence of write-in ballots, but rather in the fact that knowledge of the Nominating Committee's nominations did not become available in time to permit additional nominations by petition of members who might, for any reason, be dissatisfied with the nominations of the Nominating Committee. He urged that the Nominating Committee be appointed early enough so that it could complete its deliberations and publish the names of its nominees in the January issue of Industrial Quality Control,—certainly not later than the February Supplement to the magazine. This would permit ample time to get additional nominations by petition into the hands of the Executive Secretary by 15 April as required by the Constitution.

President Edwards endorsed this point without reservation, and undertook to urge its importance upon the incoming administration. He felt sure, he said, that anyone interested enough really to study the problem from all angles and to consider it dispassionately, would conclude that the present procedure, properly administered as proposed, is not only entirely democratic, but efficient and economical of the time of the Tellers and of those attending the Annual Meeting, and calculated to secure the most able and best possible officers for the Society.

Mr. Edwards concluded the discussion by pointing out that if, following such dispassionate consideration, some members still feel that the present procedure should be changed, this can only be brought about by amending the Constitution. A petition for such amendment, signed by at least 100 corporate members in good standing, and accompanied by the text of the desired amendment, may be presented to the Executive Secretary prior to the first of April of any year. If found to be in order, the amendment will then be submitted to the membership for adoption or rejection at the Annual Election of that year.

ADVANCE NOTICE

THIRD ANNUAL CONVENTION AMERICAN SOCIETY FOR QUALITY CONTROL AND THIRD ANNUAL NEW ENGLAND QUALITY CONTROL CONFERENCE

BOSTON, MASSACHUSETTS

THURSDAY AND FRIDAY, MAY 5 AND 6, 1949

The Executive Committe has accepted the invitation of the four New England sections to hold the Third Convention of the American Society in conjunction with the Third Annual New England Quality Control Conference on May 5 and 6, 1949, as indicated above.

The annual Conventions of the American Society have already estalished a reputation for fine programming and an excellent time all around. With the New England Region as host and Boston as the host city, we are assured that our next convention will continue in the same fine tradition. With the experience of two very successful regional conferences behind them, the New England groups are well prepared to commence farsighted and thorough planning to insure an instructive stay in the "Hub" city.

The planning committee has not yet had time to draft a complete program. However, it is likely that it will follow the general pattern of previous conventions including general sessions and clinics. Special efforts will be made to have as complete and varied a clinic program as possible with the best speakers available. Complete details will be included in later issues of Industrial Quality Control.

Meanwhile, put this convention date on your agenda and make plans to be with us all at that time.

All Sections please make note of this date and plan your 48-49 program accordingly.

ROCK RIVER VALLEY SECTION RECOGNIZED

At the Executive Committee meeting on 17 June, 1948, the Rock River Valley Section—American Society for Quality Control was recognized as the thirty-first Section of the Society. Headquarters of the Section are in Rockford, Illinois, and its membership is drawn from the North-Central and North-Western portions of the State. R. A. Wylie is Chairman of the new Section, with R. W. Hanna as Vice-Chairman and R. H. Colvin as Secretary-Treasurer.

YEAR-BOOK 1947-48

Mailing of the American Society Year-Book for 1947-48, announced in the July issue of Industrial Quality Control, was delayed until late July by unforeseen difficulties.

In the course of compiling the Year-Book, substantial numbers of errors and omissions were found in the Society's membership records. The great majority of these were discovered and corrected before the Book was finally released to the printer.

In the course of correcting the errors which were discovered, it was found possible to include in the Year-Book the names of a number, though not all, of the members who joined the Society after the closing date (1 May, 1948) and who paid dues for some portion of the fiscal year 1947-48.

The Year-Book has supposedly been mailed to all members listed in it, and to all other members joining the Society after 1 May, 1948 who have paid dues for any portion of the fiscal year 1947-48.

Because of the limited number of copies printed the 1947-48 Year-

Book cannot in general be supplied to 1948-49 members who have not paid dues for any portion of the year 1947-48. Neither can it be supplied to non-members.

All members and Section Officers are again urged to check the entries referring to them or to their Sections in the Year-Book, as requested in the July issue of Industrial Quality Control, and to inform the Executive Secretary promptly of any errors or omissions in the listings.

SUPPLEMENTAL LIST OF MEMBERS 1947-48

The following list supplements that given in the 1947-48 Year-Book, and brings the total Society membership of 2063 as shown in the Year-Book to the total of 2092 as shown in the Annual Report for 1947-48.

Transferred from grade of Senior Member to grade of Fellow

Warren E. Jones, Chicago

Additional Senior Members

F. B. Chapman, Boston
Forrest G. Fales, Boston
Ernest L. Ross, Boston
G. C. Maplesden, So. Conn.
E. C. Shuman, Philadelphia
Irvin D. Conover, Syracuse
Virgil Pepple, Dayton
S. E. Sites, Ohio

Additional Members

Frank F. Becker, Boston
Austin A. Fraser, Boston
Oscar L. Larkin, Boston
Richard G. Riley, Boston
Thomas F. Spears, Boston
D. F. Dempsey, So. Conn.
N. Hetherington, So. Conn.
Ludwig B. Mayleas, Metro.
Robert J. Pere, Metro.
Joseph Rim, Metro.
Robert Rounds, Metro.
F. B. Pickett, Buffalo
George E. Bowden, Rochester
Ralph S. Browning, Rochester
Isadore C. Bone, Syracuse
Frank Caplan, Jr., Syracuse
William M. Armstrong, Toronto
F. H. Sherman (Founding) Toronto
J. A. Alexander, Pittsburgh
Leonard P. Hartung, Indiana
Madge McQueen, At Large

Any corporate member of the Society who finds his name improperly listed or unlisted in either the Year-Book or the above list, is urged to communicate immediately with the Executive Secretary so that the error may be traced and corrected promptly.

Book Review

QUALITY CONTROL METHODS

Clifford W. Kennedy, Quality Control Engineer, Federal Products Corporation. Prentice-Hall, Inc., New York, 1948; 243 pages; $4.75. Review by Franklin E. Satterthwaite.

In the foreword the author states "Statistical Methods in Quality Control have been widely talked and written about, but gaining an understanding has often proved too difficult for those who are seeking a basic knowledge of this important phase of industrial production . . . This book is intended to fill the gap and to supply the necessary elementary information that one must have to gain a complete understanding and to prepare himself for the more technical and involved practices modern quality control requires in order to reach and maintain its full effectiveness."

The need for the type of book described is critical, and Clifford Kennedy, along with several other authors, are to be commended in their efforts to fill that need. Mr. Kennedy has demonstrated a real ability in filling that need from the lecture platform, and Quality Control owes him a great deal for his untiring efforts to that end. He has demonstrated in his book an ability to pick out the important points. He discusses them in down-to-earth style. His illustrations and examples always make the point. Where arithmetic is necessary, he goes through it in meticulous detail so that anyone can follow it. He sets forth a wealth of experience as a practical quality control worker.

In some important spots, however, Mr. Kennedy's book falls short of technical perfection. Many instructors will wish to use the book as an introductory text because of the ease with which operating personnel can understand its style. Unfortunately they may find this impossible because of these technical deficiencies. It is hoped a second edition will soon be prepared overcoming this weakness.

Introduction: Kennedy at his best. Picking up the important points. Throwing a punch line. Selling his audience. "Suppose a candy manufacturer nibbled each bonbon to be sure of its goodness before it went into the box?".

Part 1. Acceptance Sampling: The introductory sections on selecting and checking samples, sample size, quality levels, and producer's and consumer's risks are very good. The use of Peach's simplified method makes an excellent introduction to the design of a sampling plan. This is followed by the Army Ordnance and the Dodge-Romig Tables for single and double sampling. A lot of space is given to sequential sampling. The arithmetic for designing sequential plans is given in complete detail. The part closes with typical good advice on choice of acceptance plans. For example, "The first choice should be, wherever possible, to arrange no acceptance sampling at all."

Part 1 is well written except for a few technical lapses. Quality Levels would be much clearer if p_1 and p_2 were defined to be identical with Acceptable Quality Level and Lot Tolerance Percent Defective. As presented, the definitions are hazy and the reader is confused as to just what quality level is being talked about. In fact, on page 44, Lot Tolerance is used in an example as p_1 which confuses the discussion generally. On page 68 a common slip is repeated: "the chances would be 95% good that the lot was of quality equal to p_1 or better." Of course, such statements cannot be made without bringing in the theory of inverse probability. Generally if the process average is poorer than p_1, then less than 95% of the accepted lots will be better than p_1. It would be helpful if this chapter contained a clear discussion of process average as the factor which should be used to control the amount of in-

spection. The Dodge-Romig, the Army, and the Navy plans all stress the need to calculate process average. The Dodge-Romig tables are entered directly with the process average. The Army and Navy systems provide for normal, reduced, and tightened inspection, and the choice depends on process average. Any acceptance sampling routine which ignores process average will eventually get the inspector into trouble.

Part 2. Batch Control — Percent Defective Methods: This part starts out with good practical advice on using acceptance sampling techniques for process control within the factory. It then takes up the inherent error in sampling. The arithmetic for calculating three sigma limits for the percent defective is given in detail. Part 2 closes with a section on standard values and a section on practical applications of p, pn, and c charts.

However, this chapter suffers greatly because Simon's "grand lot system" has been incorrectly used to illustrate percent defective and p-chart methods. Grand-lot n instead of sub-lot n is continually used to calculate control limits. The student had better put large question marks on pages 100, 109-110 and 116-117, and on Figures 24, 26 and 28 before studying this chapter. On page 115 the author comments on the significance of a downward trend although the trend in the example used would not be considered significant by any statistical test.

Part 3. Distributions and the Standard Deviation: This part starts out with an outline of frequency distributions and histograms. The idea of substituting a smooth curve for the rough histogram leads naturally into the normal distribution as an ideal smooth curve. Central tendency is stressed and the standard deviation introduced. Many pages are given to examples of the arithmetic for calculating the standard deviation and three sigma limits. The part concludes with applications to estimating lot quality, machine accuracy, and visual inspections.

Part 3 seems to handle a difficult subject very well. Each section is blended naturally into the next one. Arithmetic is given in complete detail and repeated through many examples.

Part 4. Average and Range: This part starts off with the limitations of the standard deviation and introduces the range as a measure of variability. Again, every step is introduced easily and gradually, and the reader is constructing average and range charts before he knows it. There is a long section on interpretation and use, and a section on drawing the samples. The use of standard values is discussed in detail.

The discussion of the relation between control limits and specification limits is weak, because the author does not tell how to calculate control limits for individuals from the average range. This carries over into the discussion of standard values. On page 202 the correct formula is given in a footnote while a different one is used in the text. The two are identical for samples of four but for samples of five or more the text formula is unsafe. The discussion of standard limits based on three sigma for individuals does not appear to be correct.

Part 5. Guide to the Administration of Methods: This part gives practical advice on the installation of quality control. Fit the quality control plan to the job at hand. Proceed slowly and sell. Start out with incoming inspection or an audit of outgoing products. Introduce it slowly beside the present system until it has proved its worth and superiority. Free at least one person and delegate to him the initial steps in installing quality control. Engineering, executive, and practical **action** are necessary. Six specific examples of applications are outlined in detail.

To sum up: this book was written for practical shop men by a practical man. The points of arithmetic and theory which give the shop man trouble are outlined with every detail clearly stated. Occasionally the book gets beyond its depth technically.

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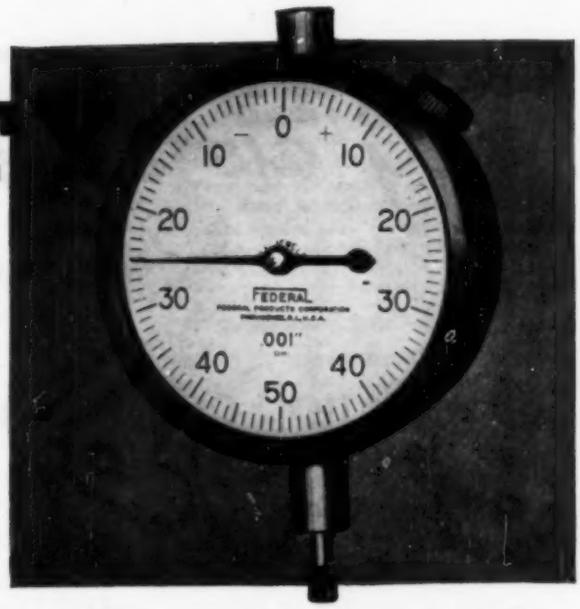

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